JUNGLE ISLANDS

THE ILLYRIA IN THE SOUTH SEAS

By

SIDNEY N. SHURCLIFF

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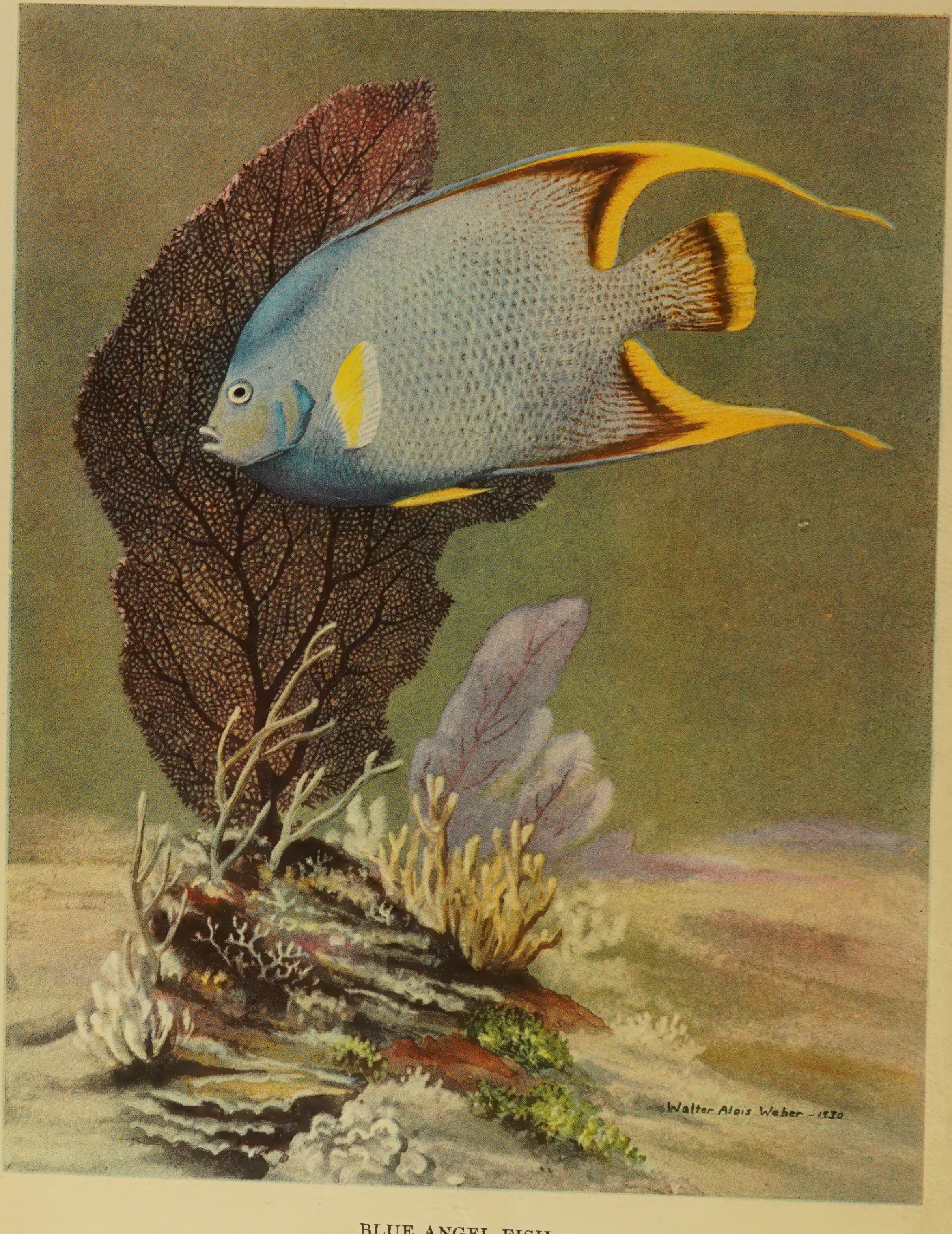
Walter Alois Weber - 1930

BLUE ANGEL FISH
Angelichthys ciliaris [Limaeus]
Bermuda

Karl P. Schmidt

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1930

JUNGLE ISLANDS

The "Illyria" in the South Seas

BY

SIDNEY NICHOLS SHURCLIFF

The Record of
THE CRANE PACIFIC EXPEDITION
FIELD MUSEUM OF NATURAL HISTORY
CHICAGO, ILLINOIS

With A Scientific Appendix By
KARL PATTERSON SCHMIDT

NINETY ILLUSTRATIONS :: TWO MAPS

COLOR PLATES :: :: DRAWINGS
By Walter A. Weber

PHOTOGRAPHS MOSTLY BY THE AUTHOR

G. P. PUTNAM'S SONS
The Knickerbocker Press
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1930

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JUNGLE ISLANDS

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by
Cornelius Crane

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The
Knickerbocker
Press
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To

R. T. CRANE, Jr.

WITHOUT WHOSE ASSISTANCE THE EXPEDITION
WOULD NEVER HAVE TAKEN PLACE

FOREWORD

THE members of the Crane Pacific Expedition of Field Museum wish to thank the many friends who have helped them in all phases of the outfitting and voyage of the *Illyria.* To Mr. Stanley Field, Mr. S. C. Simms and Dr. W. H. Osgood of Field Museum, we owe particular thanks for their initial and continued aid and friendly advice during the entire course of the expedition.

Mr. J. E. Slattery, Mr. Ralph Harris, and Mr. Frank Mason of Boston, aided us greatly before the *Illyria* left for the South Seas.

During the course of the voyage we were assisted by Gen. Russell and Dr. Freeman in Haiti, Mr. Zetek in Panama, M. Armont in the Marquesas, Governor Bouge and Mr. and Mrs. Guild in Tahiti, Messrs. Adam, Wells, Nicholson, and Robertson in the New Hebrides, Captain Hill and Mr. and Mrs. Bignell in the Solomons and Mr. Murray in Rabaul. Fr. Kirschbaum in New Guinea gave us help without which we could have accomplished nothing there.

We also wish to thank many other people whose names we have not space to mention but who were nevertheless of greatest help to us.

Finally, we are greatly indebted to Mr. G. P. Putnam, Mrs. C. A. Barbour and Mr. F. A. MacGillivray for their invaluable aid and advice in the preparation of this book.

C. C.
S. N. S.

NEW YORK,
June, 1930.

INTRODUCTION

THE Cornelius Crane Pacific Expedition of Field Museum of Natural History, of which this book is a chronicle, was one of the most important zoological expeditions undertaken for the Museum in recent years. Of unusual interest on account of the long and varied itinerary covered, this voyage aboard Mr. Cornelius Crane's brigantine yacht, the *Illyria,* had an especially romantic aspect because in large part it followed the track of the two great pioneers of science, Darwin and Wallace, whose historic expeditions laid the foundations of our modern evolutionary zoology. The *Illyria's* journey was in part along the route of Darwin on the famous voyage of the *Beagle.* The path of Wallace, scientific trail-blazer in the East Indies, was taken up by the Crane party in New Guinea, the Moluccas and Celebes.

Despite the work of Darwin and Wallace, and the many other scientific expeditions which have been conducted in subsequent years, the regions involved have much to offer that has not had adequate investigation by scientists, and the work of the members of the Crane Expedition shows that it is still possible to make important contributions to the zoological exploration of the Pacific islands. Not only did the expedition reach a field hitherto almost entirely unrepresented in the zoological collections of Field Museum, and thus by its gathering of more than 18,000 specimens vastly enrich this institution, but it also made a number of surprising discoveries which will be of interest to zoologists the world over.

Mammals, birds, fishes, reptiles, amphibians and invertebrates all figure in the Crane zoological collections. The expedition was an interesting one from the standpoint of animal geography, as it traversed several of the regions faunistically most distinct. Working first in the American tropics, as represented by Haiti, Panama and the Galápagos Islands, the expedition was brought into contact with the remarkable life of the neotropical area. Pushing onward into the South Pacific, some of the world's most brilliantly colored birds, and marine fishes of even more startling and beautiful hues, made up for the dearth of land mammals and reptiles. Thence the expedition proceeded into the New Guinean area, so rich in peculiar creatures different from those found in any other part of the world. The Solomons, New Guinea, the Moluccas and Celebes each yielded their share of desirable specimens, including examples of many curious forms of life. Finally, in Borneo and the Philippines, the party came in contact with the Oriental fauna, with its wealth of large mammals and varied bird and reptile life.

Field Museum as an institution, and the world of science at large, owe a great debt to Mr. Crane for organizing, financing and leading this expedition, and to the scientists and other members of the party through whose earnest efforts its success was made possible.

Stanley Field,
President, Field Museum of
Natural History, Chicago.

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JUNGLE ISLANDS

THE *ILLYRIA* IN THE SOUTH SEAS

W.A.W.

JUNGLE ISLANDS

THE *ILLYRIA* IN THE SOUTH SEAS

CHAPTER I

THE CRANE PACIFIC EXPEDITION

"ILLYRIA has sailed for New York."

Thus ran the cable which we received on September 14, 1928, from the shipyards at Lussinpiccolo, Italy, where Cornelius Crane's brigantine yacht *Illyria* had been under construction for over a year. The fact that she was at last in commission seemed incredible. For six successive months the launching had been postponed. During that length of time the members of the projected Crane South Sea Scientific Expedition had led a life composed of alternate periods of frantic preparation and idle impatience.

If in April the shipbuilder had been sufficiently cold-blooded to say: "No! she will not be ready until September"—it would not have led to so much irritation and confusion. Instead of that they attempted to cheer us by making optimistic promises. "Just two weeks more," they cabled, or "Yacht all finished except rudder."

However, nothing discouraged Cornelius. From the time I had known him as a school-boy, he had been determined some day to go through the South Seas, even if he had to swim. Fortunately Mr. Crane, Senior, had provided a better method of transportation. The yacht *Illyria* was built as a gift to Cornelius.

He had decided upon a ship with brigantine rig as combining some of the best features of the square rig (essentially an offshore rig), and the fore an' aft rig, which is more adapted to coastal work. The brigantine rig consists of squaresails on the foremast and fore an' aft sails on the mainmast.

The *Illyria's* length overall was to be 147′ 6″; her height of foremast 116′, mainmast 128′; her gross tonnage 356. She would carry 10,000 square feet of sail and auxiliary power would be supplied by a 300 H. P. Diesel engine.

The assembling of personnel and crew had been going briskly forward for several months. At first Cornelius had intended to take a group of friends on purely a yachting cruise. But as the *Illyria* was designed with ample accommodations, and as her owner was notably fond of hunting and fishing, it was decided that various experts in zoology, natural history and the like should be included in the party.

The trip therefore developed into a mixture of pleasure jaunt and scientific expedition. The latter phase fell logically under the wing of Field Museum of Chicago, as Cornelius is a native of that city.

The scientists of the expedition were: Karl P. Schmidt, herpetologist and director of scientific work, Walter A. Weber, artist and ornithologist, Frank C. Wonder, taxidermist, all of Field Museum; Dr. William L. Moss, of the Harvard Medical School, physician and anthropologist; Dr. Albert W. Herre, of Stanford University, ichthyologist.

THE *Illyria*

Cornelius' fellow travellers were three Harvard men: Murry N. Fairbank, Charles R. Peavy and myself. I was semi-seriously appointed motion-picture photographer.

The skipper was Captain S. B. Boutilier of Melrose, Mass.

Many scientific undertakings have been delayed at the start by unforeseen complications, but the tale of the difficulties that beset the *Illyria* and her staff from the day that she slid down the ways in Lussinpiccolo until the evening when she finally left Panama for Pacific waters is exceptionally harrowing.

A crew of specially selected American sailors had been sent over to bring the ship back. Surely nothing should go wrong with a new ship in such capable hands? What we could not foresee, for instance, was that on the sixth day out from Italy the yacht's ice-machine would break, or that the spoiled meat resulting therefrom would cause a minor mutiny among the crew. Or that the engineer would fail to care for the needs of the new engine. Yet all these things did happen, causing our good ship to arrive soiled, battered and with a disgruntled crew in Tebo Yacht Basin, New York.

It was the first of November before the captain was able to muster enough men and new machinery to bring her to Boston where stores of food and scientific equipment had long been lying in wait to go aboard her. No sooner there than the generator went wrong again and the ice-machine, out of sympathy, followed suit. The mate and engineer had to be replaced. The entrance to the hold was found to be an aperture in the bottom of a closet—too small to admit the supplies. The galley oil stove would not burn and the plumbing would not plumb.

In the meantime we kept our faces in the shadow and walked on the side-streets of Boston, for whenever we were so unfortunate as to meet a friend we heard the same cry.

"What? you still here? Why I thought you had started for the South Seas a month ago!"

Heroic efforts were now made to speed matters. The shipyard men were given double pay to work on Sundays and holidays. All the carefully packed scientific equipment was unpacked from its big crates, taken piecemeal into the hold, and stored away. Food and supplies for five months were tucked into every nook and corner.

Then a new difficulty developed. The storage space became increasingly scarce and presently vanished altogether. It was unbelievable. The architects had been told to design a boat with plenty of storage room. Then Cornelius had torn up the first draft of the plans, saying: "Now make new plans giving twice as much storage space." And in spite of this there was none.

We had boasted that ours was to be the most completely equipped scientific expedition ever to sail the Pacific. We had laid our plans to bring an aeroplane with folding wings, two motorcycles and a side car, twelve trunks of medicines, several cases of dynamite, three motion picture cameras, 50,000 feet of motion picture film, two diving outfits, a moving picture projector, 25 rifles and shotguns with ammunition, complete apparatus for the capture, preservation and mounting of specimens—and a dog mascot. All very fine, but where to put them?

Much to the disappointment of Murry Fairbank, we first had to give up the aeroplane. Then we gave away the dog.

Photo by Dadmun

Cornelius Crane

We lashed the motorcycles and side car on the quarter deck, in spite of dire warnings from the captain. Finally, we filled our staterooms, which had looked so commodious on the blueprints, until we could scarcely turn around in them.

A few days before we had finished stowing the equipment, Cornelius became seriously ill. It soon became obvious that although the yacht might possibly be able to leave on the 15th of November her owner certainly would not.

"Never mind," he said, "you fellows sail on the 15th as planned, and I will join you at Bermuda by fast steamer." Reluctantly we agreed.

On the afternoon of the 14th we stood on the dock admiring our craft in her new coat of paint, and discussing the start, all scheduled now, for the next day. But we were ahead of ourselves again, for even as we looked a larger wisp of smoke than usual arose from the galley. Out dashed the cook yelling "Fire! Fire!" It seemed that the oil stove, which for so long had refused to burn had now burnt entirely too well. A patch of woodwork in the galley was in flames.

Captain Boutilier, well aware of the presence of dynamite in our hold, sought to send only for the private fire department of the Marine works, but some busybody rang the general alarm. The dynamite lay in six cases under the bunk in Cornelius' stateroom. The captain had it rushed out to safety on the wharf. Just as the last case was carried out of danger and when the fire was well under control up rushed a goodly proportion of the Boston Fire Department, late to be sure, but full of enthusiasm. They were dashing to the gangplank when one of the loafers on the wharf cooled their ardor.

"Look out, boys," he confided in a hoarse voice, "she's loaded to the gunn'ls with dynamite—it'll blow you all to hell!"

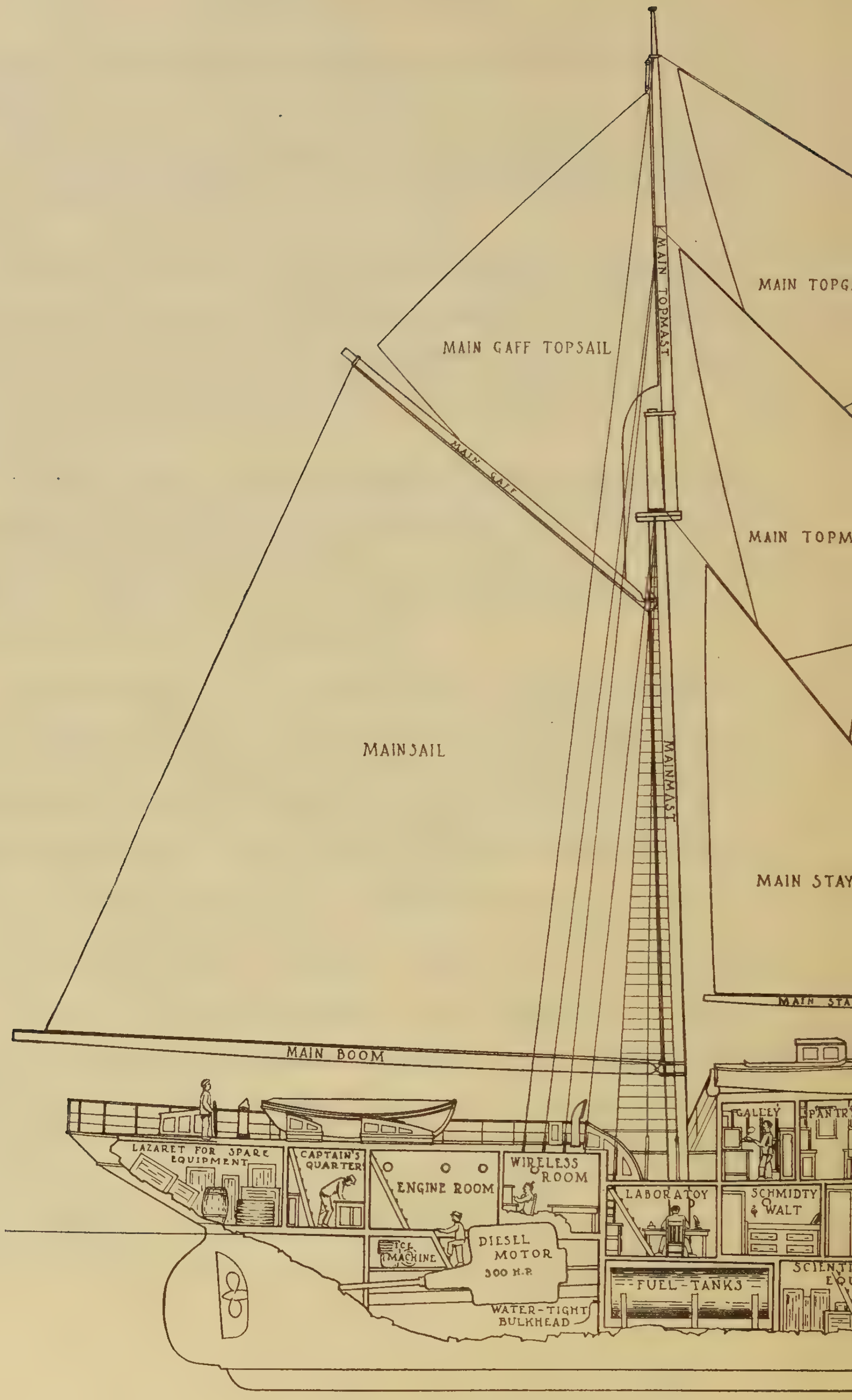
The brave firemen decided to wait for their chief. By the time he arrived the fire was out. However he had something to say.

"Don't you realize," he spluttered, "that it is against the law to carry dynamite within five hundred feet of a public landing! There's a fine and jail sentence for this. No chance of your getting away tomorrow. There's going to be an investigation."

At these words, several open-eared reporters who had been hanging about went tearing to telephones, and an hour later up and down the streets of Boston went the news—"Wuxtra! Wuxtra! *Globe, Pos', N'american!* Dynamite foun' on *Eelerear.* Owner to be arrested!"

So the fifteenth of the month dawned to find the dismembered galley stove strewn all over the wharf, while Mr. Crane, Senior, and Mr. Slattery of the Crane Company in Boston burnt up the telephone wires in an attempt to obviate the proposed investigation. But late that evening Captain Boutilier let it be known that he *felt* we could leave at ten A.M. on the following morning. This news was at once communicated to everyone except Murry Fairbank, who could not be found.

At ten o'clock on the sixteenth we all gathered at the dock, with our friends and relations who came to see us off. The stove was unfinished. There was no sign of Murry Fairbank. At eleven forty-five the newspaper photographers posed us all for group photographs. At twelve o'clock the newsreel photographers who were there to film our departure gave it up as a bad job and went away. Then Murry Fairbank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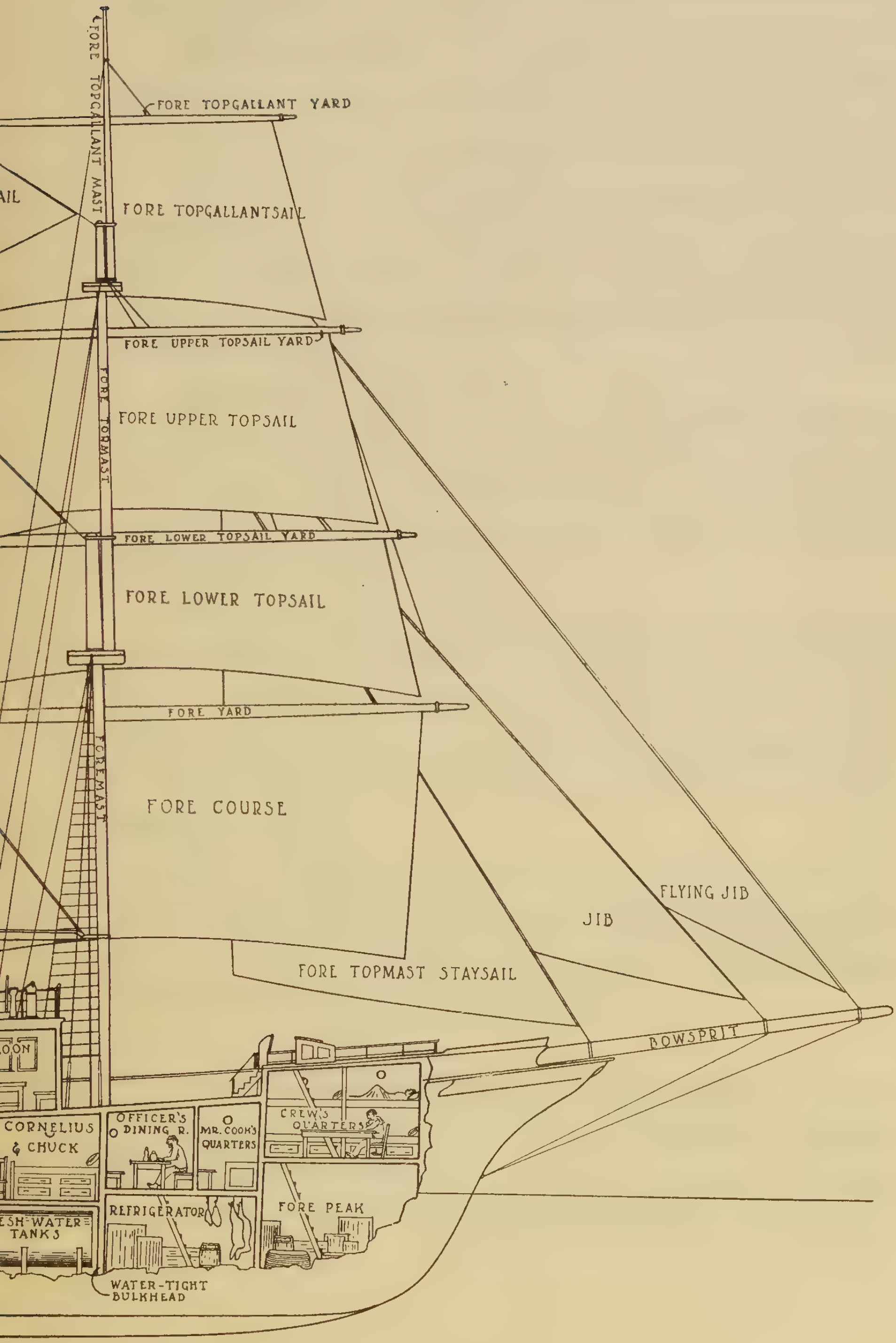
CAPTAIN'S QUARTERS
ENGINE ROOM
WIRELESS ROOM
GALLEY
PANTR
LABORATOY
SCHMIDTY & WALT
ICE MACHINE
DIESEL MOTOR 300 H.P.
FUEL TANKS
SCIENTI
EQU
WATER-TIGHT BULKHEAD

Section of the *Illy*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AIL
FORE TOPGALLANTSAIL
FORE UPPER TOPSAIL YARD
FORE TOPMAST
FORE UPPER TOPSAIL
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FORE LOWER TOPSAIL
FORE YARD
FOREMAST
FORE COURSE
FLYING JIB
JIB
FORE TOPMAST STAYSAIL
BOWSPRIT
OON
CORNELIUS & CHUCK
OFFICER'S DINING R.
MR. COOK'S QUARTERS
CREW'S QUARTERS
ESH-WATER TANKS
REFRIGERATOR
FORE PEAK
WATER-TIGHT BULKHEAD

r Her Long Voyage

drifted in. He had read in the paper that we were to sail and had come down to find out if it were true.

At twelve-fifteen we did sail—not far, you understand, just to the mouth of the harbor where we spent the whole afternoon adjusting the compasses—but still we sailed.

My rôle was to stand on the dock while the *Illyria* sailed majestically away, taking motion pictures of her progress. Then I jumped into a small tender and started along after her, setting up our complicated and expensive Akeley camera on the bow to finish the scene.

Right there in Boston harbor we almost had our first calamity. The little tender took a tremendous roll as she passed over the wake of a ferry, and the camera and I both started overboard. Only the prompt action of the pilot who dragged me in by my feet saved us both.

About sunset time, after the almost endless procedure of adjusting the compass was over, and after the last talkative lady well-wisher had been sent ashore in a small boat, we pointed our bow out to sea. Soon only a few flashing lights on the horizon served as reminders of the port that had detained us so long.

With a distinct homesick feeling, we set about the task of stowing away some of the books which had lain during the day ankle deep on the floor of the saloon. Then all hands turned in for some much-needed sleep.

. . . .

Five days later a cheerful negro pilot helped us thread our way into the beautiful harbor of Hamilton, Bermuda. We had spent those five days to good advantage in accustoming ourselves to the sea, the ship and each other. Everyone ex-

THE *ILLYRIA'S* MUSTER

POSITION ON ILLYRIA	FULL NAME	NICKNAME	AGE AT START OF TRIP	YEARS AT SEA BEFORE START OF TRIP
Leader of Expedition	Cornelius Crane	"Corny"	23	Many
Head of Scientific Staff	Karl P. Schmidt	"Schmidty"	38	0
Physician	William L. Moss	"Bill"	52	0
Ichthyologist & Botanist	Albert W. Herre		59	0
Collector & Artist	Walter Alois Weber	"Walt"	22	0
Collector & Taxidermist	Frank C. Wonder	"Frank"	24	0
Friend of Cornelius	Sidney N. Shurcliff	"Sid"	22	0
" " "	Murry N. Fairbank	"Murry"	22	2
" " "	Charles R. Peavy	"Chuck"	24	All my life
Captain & Navigator	Seldon B. Boutilier		48	30
Mate	Ernest S. Cook		34	19
Second Mate & Radio Op.	Harry F. Briggs		29	12
Steward	William E. Dwyer	"Bill" or "Stew"	37	14
Chief Engineer	John W. Mulligan	"Chief"	32	16
Second Engineer	Michael Kearney	"Mike"	26	4
Third Engineer	John Hollander	"John"	23	2
Second Steward	Frank Cesky	"Frank"	28	2
Mess Boy	Vernon Stevens	"Steve"	23	8
Chief Cook	Rudi Kleff	"Rudi"	28	2
Second Cook	Robert Lübner	"Bob"	29	4
Sailor before Mast	John Pavilos	"John"	29	10
" " "	Simon Boutilier	"Sim"	25	7
" " "	Lawrence Sidelinker	"Big Si"	22	2½
" " "	Borden Boutilier	"Borden"	23	8
" " "	Harrison Sidelinker	"Little Si"	17	0
" " "	Joe Barton	"Joe"	30	12
" " "	Th. A. Hollander	"Dutch"	29	12
" " "	Harrison Small	"Small"	23	1

FOR THE EXPEDITION

PLACE OF BIRTH	OCCUPATIONS BEFORE START OF TRIP
Chicago	Hunting, yachting, etc.
Lake Forest, Ill.	Farming, teaching—American Museum of Nat. Hist., N. Y., Asst. Curator Reptiles at Field Museum, Chicago.
Athens, Ga.	Asst. Prof. Bacteriology at Harvard Medical School, Children's Hospital.
Toledo, Ohio	School teacher, travelling salesman, gymnast, journalist, professor, Director of Fisheries in Philippines, Curator Zoology at Museum, Stanford University.
Chicago	University of Chicago, Art Institute of Chicago.
Chicago	Bootlegger, pugilist, bicycle racer, gun repairer, taxidermist for Field Museum.
Boston	Harvard College '27—Harvard School of Landscape Architecture.
Prescott, Ariz.	Harvard College '28. Superintendent Airplane Maintenance, Boston Airport Corp.
Williams Station, Ala.	Harvard ex-'28—travelling.
Halifax, N. S.	Master of Cornelius Crane's "Megildis." 11 years with Coastwise S. S. Company, etc.
Red Beach, Me.	Chief of S. S. "Jeanette Spinner." 9 years in sailing ships. Years on "West Campgaw." Was once washed overboard in a storm but next wave put him back on deck.
Skegness, England	Radio instructor for Radio Corp. of Amer. Ship radio operator.
W. Somerville, Mass.	Painter, mgr. Ginter Co. store, U. S. army, druggist, meat cutter, butcher, plumber, steward on Cornelius Crane's "Megildis."
Bayonne, N. J.	Naval officer, rum runner, engine erector, machinist.
County Cork, Ireland	Machinist, oiler, Ford factory, 4th Engineer on Yacht "Savarona."
Boston	Machinist in East Boston.
Kladno, Czechoslovakia	Machinist in Papeete, Tahiti.
Kittery, Maine	Three years in U. S. Coast Guard.
Alsum a/Rhein	Baker, pastry cook, restaurant owner in Hoboken.
Germany	Chauffeur on Long Island, German Army, electrical engineer, carpenter, dishwasher, butler, baker, porter, painter, pastry cook.
Riga, Russia	Had been sailor on Amer. boats as long as he could remember.
Seabright, N. S.	Carpenter at Haverhill, Mass.
Boston	Cadet on Schoolship.
Seabright, N. S.	Farmer.
No. Wilmington, Mass.	School.
Forth Author, Texas	Sailor on American ships for 12 years.
Hague, Holland	Sailor all over the world. Speaks 5 languages.
	Cadet on Schoolship.

cept Frank Wonder had been at sea before, and everyone except Frank Wonder was utterly seasick.

The *Illyria* had made the most of a fair breeze all the way down and sailed along on the port tack often at a speed of nine knots.

The new engineer had encountered a few difficulties with the generator and the ice-machine, but through the help of Murry Fairbank these had been mostly ironed out.

The crew had proved themselves capable at handling the canvas, even in a stiff breeze, and the new mate, Mr. Cook, showed himself to be a man of tremendous energy and ability.

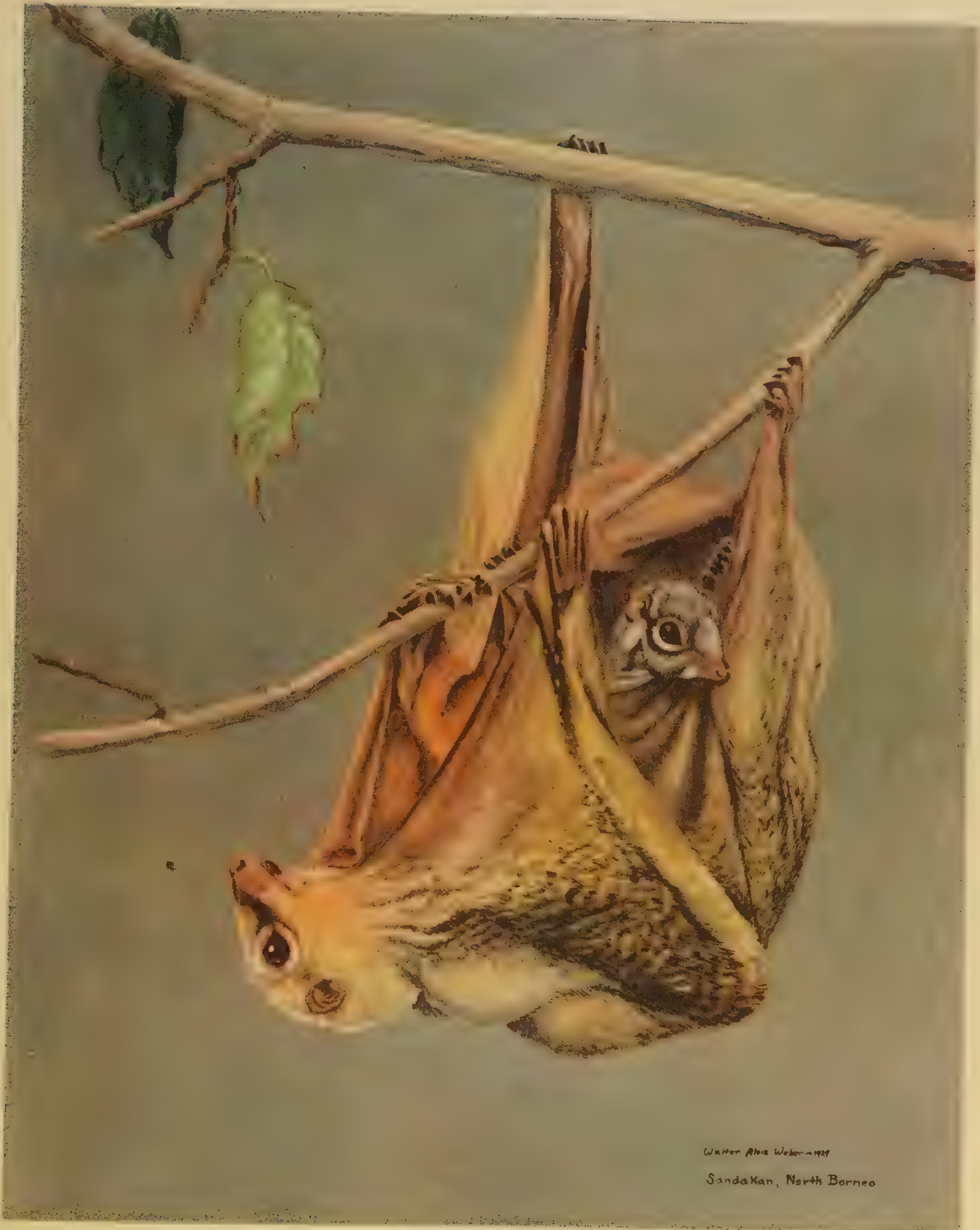
So aside from the seasickness we were all fairly well satisfied at the behavior of our craft and ourselves during this test trip.

At Hamilton we found Cornelius, now well, and his father, waiting at the pier to take us to dinner. We needed this meal because the galley stove had stopped working again. We talked things over late that evening and came to several conclusions—that the motorcycles would have to be sent home—that the owner's launch, too delicately built for use among coral reefs, should be left in Bermuda—that we needed another outboard tender—and that the only place we could put the twenty barrels of potatoes that were waiting to go aboard would be on the after-deck, next the rail.

Murry and I pleaded that one motorcycle should be retained, even if we had to put it in our stateroom.

"All right," said Cornelius laughing, "if you can get it in your stateroom you can keep it—otherwise it goes home."

So the next day Murry and I put our heads together and took the motorcycle apart. We put the frame and wheels


Walter Alois Weber - 1929
Sandakan, North Borneo

FLYING LEMUR
Colugo volans [Linnaeus]
North Borneo

under his bunk and the motor into our trunk. Then ushering in Cornelius, we asked him if the room was in good enough order to suit him.

"Why, yes," he said, "but what is that curious smell of rubber?"

"Oh just the motorcycle tires under Murry's bed," we answered. He let us keep it.

In the meantime the potatoes were put aboard, the galley stove was repaired again, the big launch was removed to a storehouse and a radiogram sent off for a new outboard motor to be shipped to Panama. Having settled all these weighty matters we felt free to go ashore to look about.

People who have visited Bermuda know that among subtropical islands it is unique, chiefly because it is composed as a whole of soft limestone, so white and chalky that it resembles the chalk cliffs of France. This limestone dictates the landscape, the architecture, the roads—in fact the whole aspect of the place.

The limestone can be quarried out with a saw, so whenever the roads encounter hills or other obstructions, they are cut directly into the ground, often to a depth of twenty to thirty feet, with vertical walls. Where the roads pass through fields or valleys, they are carefully walled in with neatly piled blocks of the same material.

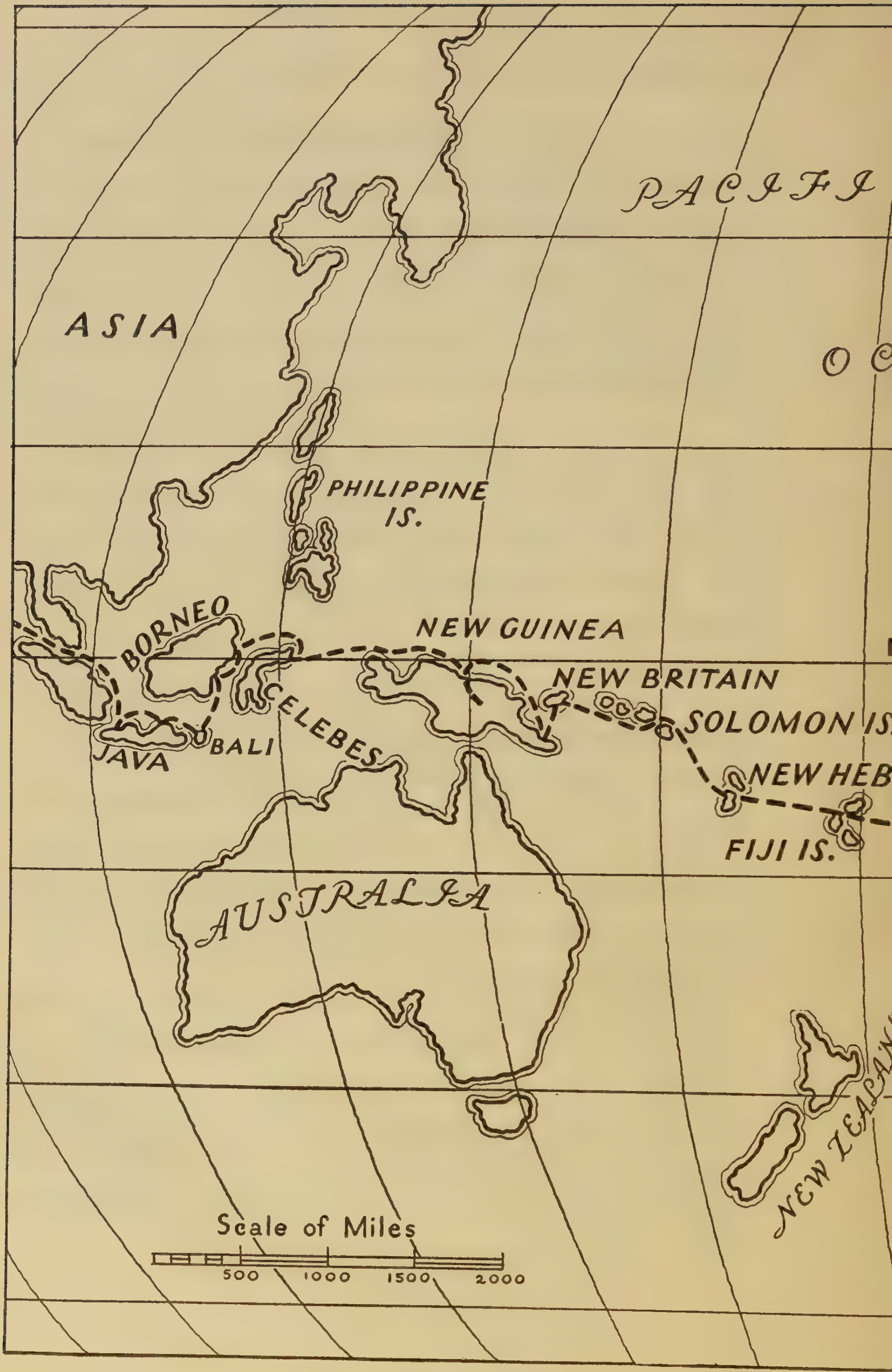
Not only are the foundations, steps and walls of the houses built of these stuccoed stone blocks, but also their roofs. The stone lends itself to simple lines without much ornament, and after weathering a short time it takes on a light gray color. Consequently, though any one house may not be of interest, a group of houses of different sizes and shapes, but all of the same texture and color, have a unity which from a distance is startlingly beautiful.

Bermuda is a tourist-made country, and this has its effect on the lives of the inhabitants. Since there is no large-scale agriculture, there are no big monotonous fields with over-orderly rows of produce, no cocoanut groves with stiff lines of trees, and no oppressed, overworked class of laborers. Each of the many negro cottages adjoins its own little garden, where the owner and his family may work or not as they choose—and often they don't choose.

Even for the Englishman, there is little business in Bermuda save hotel and shopkeeping. At these activities they amuse themselves in the tourist season, while during the remainder of the year they have a full measure of leisure. We were there out of season and of three dentists on whom I called two had office hours only two days a week, and the other would not see me at all!

At night Bermuda is at her best. The atmosphere, softly warm and sweet-scented, is saturated with romance. Except for the distant music of negro voices, and the rattle of an occasional carriage, there is no sound to interrupt the bell-like singing of the tree frogs. The little houses loom dimly mysterious in the moonlight that filters through the palm fronds.

But while to the song of these tree frogs I meditated on beauty and romance, Schmidty was engaged in the much more practical business of securing some of them for specimens. Armed with a flashlight and his inexhaustible patience, he had invaded one of the hotel gardens and with great deliberation had waited silently till near him a little frog uttered a musical chirp. At each chirp our Herpetologist would steal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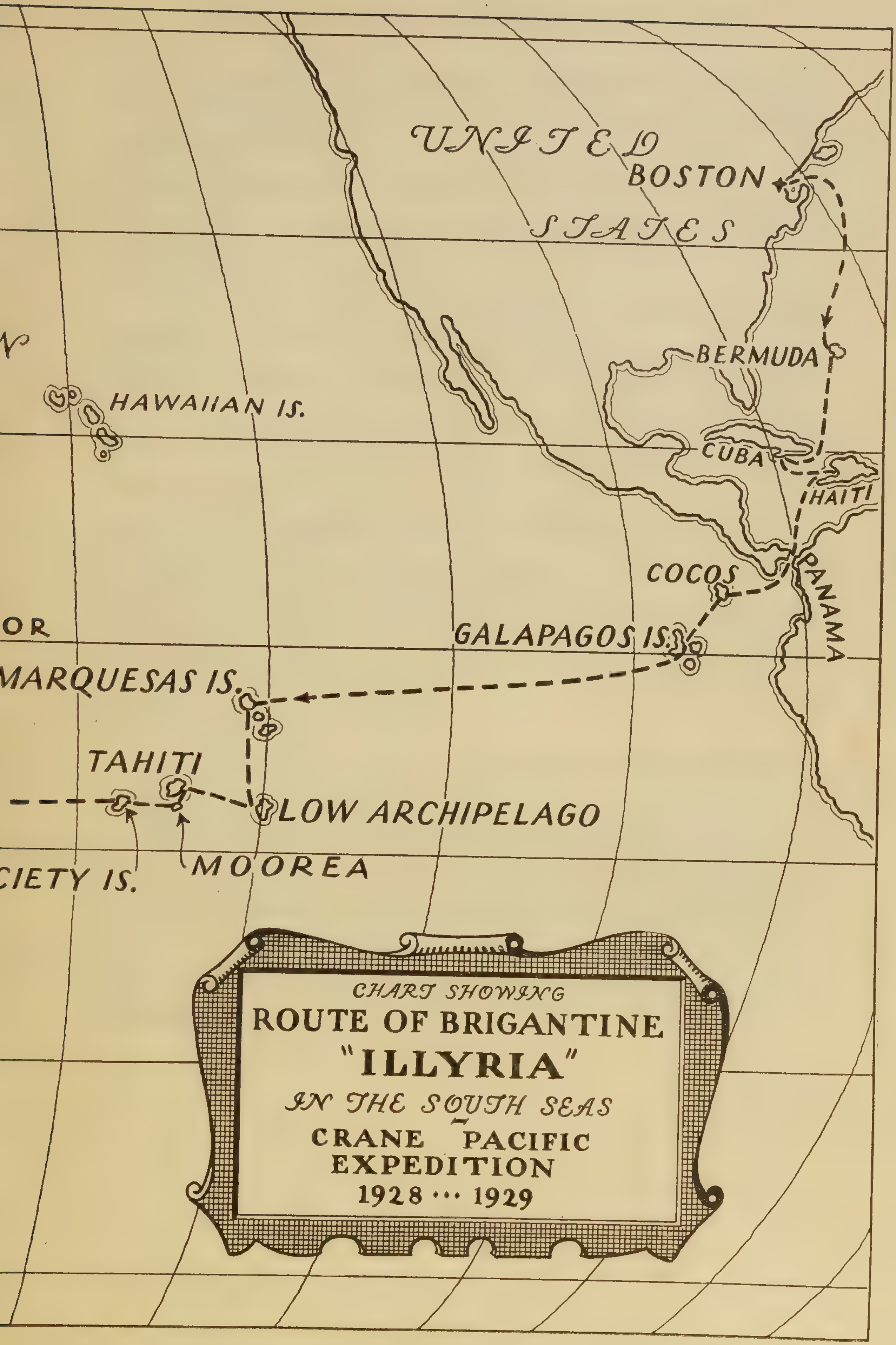
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IN THE SOUTH SEAS
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EXPEDITION
1928 ··· 1929

a little closer until it was possible to pounce upon the singer in his hiding place among the leaves. One thing that makes the finding of these night singers particularly difficult is the fact that they are all ventriloquists. Very late Schmidty and Walt Weber returned to the ship with the first specimens to the credit of the expedition.

On the following day this patient pair and Frank Wonder engaged in a lizard hunt in an abandoned quarry on the outskirts of Hamilton. In addition to a few specimens of the native lizard, the only vertebrate animal of Bermudian origin, they were fortunate in finding a female frog with several clusters of her pearly eggs. The frogs of this West Indian group (the Bermudian frog comes from Jamaica) are remarkable for the fact that their eggs are laid on land where they develop into tiny froglets without passing through a tadpole stage in water as do our Northern frogs. We could see the embryo frogs, some nearly ready to hatch, inside the transparent envelopes of the eggs.

Two days and a half saw the *Illyria* through the minor repairs that were absolutely essential.

While they were being attended to, we had enjoyed ourselves so much that we were loath to get under way again. It is the famous first step that costs! However, it was necessary to push forward the first lap of the trip, and one afternoon saw us headed out of Hamilton harbor, bound south for Haiti.

CHAPTER II

HAITI, THE BLACK DEMOCRACY

WE had been in high spirits during our stay in Bermuda, but our mood changed as soon as we left protected waters, because the *Illyria* began to roll badly and everyone but Frank Wonder became seasick again.

On the morning after our departure those of us who had been able to sleep, awoke to find our ship bucking against a head wind and the sea both angry and rough. The waves continued to increase in size and by noon were so threatening that we had to shut off the power, hoist the storm trysail, and "heave to." All that day and far into the night we remained almost stationary, riding out the gale.

Just before dawn I was awakened from a fitful sleep by a deafening noise resembling the clatter of a riveting machine. Convinced that there had been a serious accident, I rushed up on deck clad only in pyjamas.

"Mr. Cook!" I yelled to the mate who was then on watch. "What in hell was that? Did the motor drop out?"

"Tain't nawthing, Mr. Shurcliff, sir, Mr. Shurcliff," replied Mr. Cook politely, "jest that g—— d—— generator breaking down again!"

By nine o'clock in the morning the wind had shifted sufficiently toward the stern quarter to allow us to push slowly along under jib and lower staysail. Just before lunch the galley range broke down again and we had to face the prospect of eating only cold food for several days. The generator also stayed out of commission for some time in spite of mighty efforts and mighty oaths on the part of the engineer. This was unfortunate because the *Illyria,* like most modern yachts, relies on her generating plant not only for lighting and for power for hoisting sails and anchor, but also for refrigeration, water circulation and for the supply of fuel oil to the main motor and the galley range. Cornelius decided that if the generator should fail once more he would have a new and larger one installed in Panama.

Toward evening of the same day the wind dropped enough to allow us to set all the square sails but the sea continued so rough that the *Illyria* rolled first one rail under water and then the other.

Supper turned out to be a hilarious meal. Just as we sat down to the table the yacht gave a tremendous lurch and all the books fell out of the bookcase with a dull roar and cascaded in an avalanche over the floor. The two electric lamps on the table tipped into the soup and several dishes fell onto the floor, even though the table was set on gymbals.

"Yeow! Lookout!" shouted Schmidty as he, Murry and Dr. Moss simultaneously tipped over backward and crashed into the mahogany sideboard.

"I'm next!" came Frank Wonder's shouted warning. Sitting in his chair, in an upright position with a spoonful of soup half way to his mouth, he coasted backward the whole length of the room and overturned onto the movie projector which was also sliding around loose. The damage was considerable.

Next day the sea became much calmer and the overworked engineers were able to get some much-needed sleep while Murry Fairbank stood a four hour watch in the engine room. Cornelius and Captain Boutilier, with admirable optimism, began to study harbors in the Galápagos Islands. The scientists, furbishing up their equipment, talked of harpooning porpoises and sharks. However the only game encountered were flying fish.

At historic Santiago we stopped long enough to pick up Chuck Peavy, who, having come by boat and train from Miami, Florida, was the last man to join the expedition. Unfortunately for those of us who wished to see Santiago, Chuck was waiting outside the harbor in a small boat so we had no excuse for a trip ashore.

. . . .

On the evening of the following day we reached the mountain-enclosed, flower-scented harbor of Port au Prince, Haiti. Early the next morning the *Illyria* was surrounded by rowboats full of scantily clad boys who wished to sell us fruit or to dive for nickels (union rules forbid pennies). Some of the more daring ones were willing to go completely under the boat for a dime. In spite of their youth these little Haitians were both greedy and insolent to strangers.

There were three things we meant to do with our eight days in Hispaniola: an expedition to San Domingo City, a collecting trip to the mountains and a journey to the Citadel near Cape Haitien. We spent most of the first day preparing for these, but we still had a little time to look about the city and meet some of its inhabitants.

The most picturesque features of Port au Prince that we could find were the two large market places, where hundreds of natives come early every morning to sell or exchange their produce. At the market one sees these queer black folk squatting, thick as flies, on the ground, busily engaged in talking, eating, pawing over their wares and seemingly doing everything but trading.

Each and every family utilized the services of at least one small donkey, and we were amused to see how they loaded the poor beast down with all sorts of burdens on the way to market and then took turns riding him home again. These Haitians are very poor indeed. We were told that the money income of each family is less than $30 a year and we saw for ourselves that although bananas could be bought for a cent a dozen small boys would beg to be allowed to eat the empty skins. A large number of the poorer natives live in rickety shacks at the edge of the city and the smell resulting from overcrowded housing conditions and the lack of drainage is appalling.

In strong contrast with the poverty stricken natives of the outlying villages are the more educated black and mulatto citizens of Port au Prince. Though actually not much richer than the peasants they wear fine clothes and buy large, up-to-date automobiles on credit. In these cars they go tearing about the narrow city streets with greater speed and less skill than the notorious Paris taxi-drivers. Collisions are both frequent and serious—in fact, Cornelius saw three persons killed in one accident—and a car seldom lasts until the final installment on it is paid. Very conscious that they are citizens in a black democracy some of these city dwellers are by turns insolent and importunate to white visitors.

On the afternoon of our first day we went to see some live snakes which Dr. Vincent of the Service Technique kept caged in an upper room of the new École d'Agriculture. With surprising unconcern Schmidty reached into the cage and pulled out the largest one. The snake, an ugly green reptile with white spots, twisted about and quickly bit our herpetologist twice on the wrist. Schmidty's calm was undisturbed. With a pleasant smile he returned the offender to the cage and remarked, "Yes, I *thought* that was a biting snake."

We had dinner that evening at the house of General Russell of the U. S. Marines. Having incorrectly heard that there were three women among our party, Mrs. Schmidt, Mrs. Weber, and Mrs. Herre, Mrs. Russell had invited the necessary number of ladies to balance the sexes. As a result the three unsuspecting ladies who were present found themselves confronted by twelve men. However, this was no drawback to a very successful evening and we all listened with interest to the General's account of Dr. Beebe's recent visit to Haiti and of his descent in a diving helmet to a depth of nearly twelve fathoms. We knew that we should be attempting similar feats before long.

In spite of going very late to bed we arose the next morning

The Mountain Road Between Port-au-Prince and Santo Domingo

at three-thirty A.M., and five o'clock found us on the dock all ready to start on our trip of 230 miles overland to San Domingo City. We had engaged two old but serviceable seven-passenger cars into which we piled our suitcases, food and the bulky Akeley camera and tripod. Although only Cornelius, Dr. Moss, Chuck, Murry and myself went on this trip we found that on such a long and uncomfortable journey we needed the extra space given by two cars.

The half-breed chauffeur of the leading car decided that we were in a tremendous hurry. Although it was still quite dark and although the road was crowded with men, women and children on their way from the country to market, each leading a well-loaded donkey, our driver put his hand on the horn-button and his foot on the accelerator and tore through everything at forty-five miles an hour.

"This fellow seems to think he is Barney Oldfield!" said Cornelius.

Children dove with screams of fright headfirst into ditches and the owners of those stubborn donkeys who did not appreciate the danger literally shoved or carried them off the road, while ducks, hens, pigs and dogs scrambled wildly for safety. Behind us in a swirl of dust we left a wake of upset loads, kicking donkeys and jabbering humans worthy of a small tornado. Mr. Oldfield triumphantly ground out the lives of those few small animals which remained on the road and then turned to us with a look suggesting that of a clever dog expecting approbation. He did not get it.

After crossing twelve miles of broad fertile plain our road led into the mountains and almost lost its sense of direction in hairpin turns and "S" curves. Higher and higher we climbed with boiling radiators and grinding gears until at an elevation of over a thousand feet we got our last backward glimpse of Port au Prince, silvered by the first rays of the rising sun. Into the heart of the mountains we sped, the yellow gravel flying as we rounded sharp turns and the water seething as we forded unbridged brooks. Banana plantations, solitary thatched houses, quaint ramshackle villages and tropical forests merged into one another as they reeled by on either side.

Less and less frequently did we meet the gaunt ebony-hued natives, formerly so numerous along the road. Wilder and wilder became the tangle of vines, bushes, and trees which hemmed us in. The road itself soon became a mere grass grown track lined with deep ruts and pock-marked with mud-puddles. We continued without interruption to the boundary-line of San Domingo—some sixty miles from Port au Prince. On each side of the border our cars and our luggage were very thoroughly searched by black officials. Even the condition of the automobile tires and the amount of gasoline in the tanks had to be recorded. Finally convinced that we were neither immigrants nor criminals, the authorities allowed us to proceed.

On the San Domingo side of the border the road was not only straighter but also smoother and wider. Barney Oldfield took advantage of this to increase his speed to between 55 and 60 miles an hour. It took considerable argument to make him reduce this rate.

At a small town some 30 miles beyond the border where we stopped for lunch we had our first close glimpse of the Santo Domingans who in contrast with the nearly pure black natives of Haiti show a large admixture of white blood. They are also more intelligent, better educated, and better dressed than the Haitians. One of their most interesting traits is their extraordinary cleanliness. The per capita consumption of soap in Santo Domingo is greater than in any other country in the world. The clothes were spotless. The shining faces of even the small children attested careful scrubbing, while at every stream we could see women of all ages engaged in the ancient process of washing clothes by beating them on convenient rocks.

After lunch we climbed over a rugged mountain range and descended to a broad valley where we found waiting for us Mr. Cocco, a relative of Dr. Moss and superintendent of S. D. Highways. Mr. Cocco explained that since the bridge across the river had been lately carried away by a flood it would be necessary to cross on an improvised ferry which he, as the Superintendent of Highways, had arranged a little further down-stream. We got across only with the greatest difficulty and as one of the motors drove off the ferry the improvised gangplank slipped so that the car fell about two feet nearly dismounting Chuck Peavy.

A word of warning to those who contemplate visiting San Domingo City! There are hazards in hotel life there. True, we based our judgment on a stay of only two nights, but these were eventful. Our hotel was said to be the best in the city but we discovered on the first evening that the food was either too highly seasoned or had attained too great an age to be edible. So we had to fall back on bread and boiled eggs. While waiting for the eggs to boil we noticed several mice who playfully scurried about the dining room floor and later our attention was attracted to some small bats which swooped about amongst the diners narrowly missing their heads.

In the bedrooms the fauna was even more varied than in the dining room. Although each bed was provided with an elaborate mosquito net, no provision had been made against those insects politely known as "beetles." Murry discovered several under his pillow and I found an army of them in my closet. The advance guard entered my suitcase. For several days I had to shake cockroaches out of my clothes before putting them on.

Cornelius, however, encountered the greatest danger. Just about bed-time he called us into his room.

"Holy smoke!" he said, "look what's on my wall! I think it's a tarantula!"

Sure enough, a large black spider nearly four inches across could be seen on the wall near the head of his bed. We attacked with newspapers and books but our adversary sought safety on the high bathroom ceiling and got out of range.

"One thing is certain," said Cornelius, "I won't go to bed until that monster is dead."

"Guess you'll have to stay up all night," said Murry encouragingly. "We can't possibly reach him."

"What about using the wire that holds up the mosquito netting over my bed?" asked Chuck. "We can bend it straight, tie a newspaper to the end and then set it on fire underneath the spider."

His plan seemed a good one so we proceeded to execute it. Chuck stood on my shoulders and held his bundle of flaming newspapers under the evasive spider until it became so singed that it fell into the tub. There we were able to finish the execution by drowning. Any damage that the ceiling may have suffered in this process was easily counterbalanced by the enormous hotel reckoning handed to us on our departure.

On the morning after our arrival Mr. Cocco appeared with two cars to show us about the city. Driving through narrow, crowded streets bordered by mean, cramped stucco houses of one or two stories, our first stop was at the Administration building. Here Mr. Cocco showed us his office and some of his plans for improving highway construction and maintenance. Judging by the condition of even the most important city streets it would be highly desirable if some of these plans could be put into immediate effect.

As we continued to drive about the city all the rest of the day we were able to see a very large part of it. What once must have been a charming town of harmonious Spanish architecture is now a maze of narrow streets upon which front only the meanest and ugliest of dwelling houses—many with only one room and one window each.

Cathedrals and churches which once were rich enough to draw an attack by Sir Francis Drake are now roofless, and windowless. We were amused to see a large hand laundry in full operation in the nave of one of the finest old cathedrals. Even the house built by Diego Columbus, son of Christopher, the house from which all the Spanish possessions in America were ruled for generations, is now in the last stages of decay. This fine old building could be easily restored but unless steps to preserve it are soon taken, it also, will be smothered by the advancing ranks of tenement houses.

The Cathedral of San Domingo City is one building which has withstood successfully the ravages of time. It has been used almost continuously for religious services since it was built in 1514 and the inhabitants of the city are very proud of it. The old priest who showed us about the interior pointed to a leaden casket in which are supposed to lie the remains of Christopher Columbus himself.

Mr. Cocco smiled benevolently. "Maybe it *is* Chris," he whispered, but I have never seen a Spanish town where he *wasn't* buried!"

The United States is most obviously represented in San Domingo City by the battleship *Memphis* which, rusty and forlorn, has blocked one of the finest views in the harbor since it was grounded there by a tidal wave in 1909. Too poor to attempt to remove her, the San Domingans allow her to stand there, a continual reminder of the one-time misfortune (or was it inefficiency?) of the United States Navy.

Fortunately, our one day in San Domingo City was a Saturday, since one of the most interesting customs of the inhabitants is the Saturday evening promenade. While the civic orchestra plays martial tunes in the band-stand near its center, most of the citizens, dressed in their finest, walk around and around the city square. In one direction go the women and girls laughing, talking to each other and apparently taking no notice of the men who take their promenade in the opposite direction. Round and round they go from early in the evening until midnight completing the circuit of the square about every ten minutes. At the same time those individuals who are lucky enough to own automobiles attempt to do the same thing in their cars. However, there are too many cars for this effort to meet with any success, and before long such a traffic tangle occurs that no car can move. This is quite satisfactory to the drivers, who, shutting off their motors, are able to enjoy the music and to be seen in their automobiles without wasting any gasoline.

Although we had asked the desk clerk at our hotel to wake us at four-thirty on Sunday morning, he routed us out of bed at three-forty instead. With this unexpectedly early start we were easily able to leave at five, but it availed us nothing for when we reached the river at which the ferry operated we were delayed for two hours. The river had fallen so low that the ferry could not be brought close to either bank. The ferry crew preferred to dig out the river bottom rather than to move the approaches and of course the swift current filled up the excavation as fast as they could dig it. When we finally did get across we were so exhausted that we were content to let Barney drive us as fast as he wanted all the way to Port au Prince.

We arrived at the ship quite late at night but instead of going to bed we all sat up to talk to Schmidty about his collecting expedition from which he had just returned. He had spent three days on the mountain-tops near Port au Prince and with Walt and Frank had secured a fine collection of small birds and lizards for the Museum. None of the specimens were new to science but some were rare and interesting. We were so interested in looking at them that it was well after midnight before we got to bed.

We had to be ready to start for Cape Haitien at four the next morning. The strain of our hard drive must have been too much for Cornelius for he became sick during the night and was unable to leave the next morning. Dr. Moss, also feeling quite tired, stayed with him. This left only six to go to Cape Haitien by automobiles. Cornelius made the trip later by airplane.

From Port au Prince the road leads along the shore for about thirty miles and then inland over some steep mountain ranges to the Cape, a hundred and fifty miles away. Barney driving faster than ever, took us at first through the same sort of beautiful country we had seen before. Palm and mango trees, banana plants, multitudes of absolutely black natives riding or leading very excessively burdened donkeys, native villages with houses consisting of wattle and daub walls, thatched roofs and no windows—livestock running around everywhere; these are the characteristics of Haitian landscapes. Among the Haitians one is even more of a foreigner than among the Solomon Islanders or the wild tribes of New Guinea because while one can usually talk to the latter in "bêche-la-mar," even with a knowledge of French it is nearly impossible to cope with the Haitian patois.

In one little town where we stopped to repair a breakdown I was able to get some motion pictures of the inhabitants. They hate to be photographed because they connect the camera with the much feared Voodoo. But with the telephoto lens I could shoot scene after scene before they realized the "evil eye" was upon them. On the whole these natives are simple and ignorant people. They are so poor that they have not even the simplest conveniences or even tools, so they live entirely off the land. In fact they are pleased to receive presents of empty bottles and old tin cans. As children they are very intelligent and bright but after a few years, when the hereditary syphilis, with which about sixty-five per cent of them are affected, begins to show its hand, they soon lose their vitality

Schmidty and Walt Hunting Lizards Along the Road to Cape Haitien

and grow old. Many of them spend their days in a kind of dull stupor.

In the same village where I took the movies Schmidty and Walt went about with small pistols which they discharged in a sort of desultory fashion at lizards and frogs. The natives watched with interest but uttered no sound either of approval or protest when these strangers entered a farm-yard without permission and continued their strange activities. I noticed, however, that they seemed quite excited whenever Walt went near a certain corner. Before I had time to say anything Walt did walk into that corner—then with a hoarse yell, dropped his pistol and came running out again. He had stepped on a big hornets' nest! The natives roared with laughter.

After the repairs had been made Barney Oldfield, in a fit of temper, made a special effort to run over any animals that might be in the road. Within two miles he killed one little pig, two middle sized pigs, a hen, and five chickens. This was too much for Murry Fairbank who gave explicit instructions that nothing more was to be run over. Still in a temper Barney deliberately hit a small dog which ran yelping shrilly to a distressed old woman. In no certain terms Murry invited Barney to get out and have his "block knocked off." The culprit escaped this fate however by promising not to do it again.

At noon we picnicked at the top of a high mountain pass. Chill winds which blew through the notch forced us to wear our coats but it also blew away the clouds which had obscured the view. Through a widening rift we caught our first glimpse of the famous citadel—twenty miles away. Even at such a

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distance it was the most noticeable feature in the landscape—a Maxfield Parish castle balanced upon precipitous purple cliffs, enframed by fleecy clouds and silhouetted against a clear blue sky. Inaccessible and mysterious, it seemed almost enchanted.

Plunging down the green valley into the cool woods again we lost all sight of this stony summit, the real objective of our journey, until a few minutes before we reached it on the following day. Instead we saw only more thatched houses and more uncomplaining donkeys until in mid-afternoon we reached the old town of Cape Haitien. We made our way to the only hotel and had just started to refresh ourselves when Colonels Clinton and Henley of the Marines paid us a call. Having heard from Gen. Russell that we were coming they had made plans to take care of us during our short stay. Colonel Clinton invited us to dinner and Colonel Henley offered not only to take us on the morrow to the citadel but also to show us about the town at once.

The crumbling ruins of the old city of Cape Haitien are the only visible remains of a long and interesting past. I saw them through something of a fog brought on by Captain Clinton's excellent cocktails but I have a distinct recollection of long brick walls and mounds of displaced masonry. "Le Cap" as the natives call it was once a very gay city indeed. Under the French rule it was the capital of Haiti and boasted several grand palaces and a flourishing university. Its inhabitants had a reputation for social grace and for learning which was well known in the United States and France. It must have been a smaller edition of the Paris of those days.

Then three terrible misfortunes fell on the city. The famous Toussaint L'Ouverture captured and burned it in 1791. Fifty years were spent in rebuilding, and then it was destroyed again by a great earthquake. The people reconstructed the city once more but the British destroyed it for the third time by bombardment in 1865. Apparently discouraged by all these reverses the 15,000 blacks who now dwell here are apparently satisfied to live in the meanest and ugliest of cheaply constructed houses. Among them the beautiful imported bricks of the old ruins shine like dimmed jewels mourning their former splendor.

Colonel Henley had asked us to be ready to leave our hotel at 5:45 the following morning for an early start to the citadel. He emphasized the fact that we must be at the railroad station, a mile from the hotel, at six, in order to avoid a head-on collision between the gasoline driven hand-car we were to use and the incoming local train. He personally instructed Barney Oldfield to call for us at five-forty. Imagine then our surprise and consternation when, having struggled out of bed at an unearthly hour for the sixth morning in succession, and having literally cooked our own breakfast to be ready on time, Barney did not appear. We waited until six and then ran all the way to the station with our heavy cameras and supplies.

The Colonel was quite angry at our tardiness but transferred his wrath to the absent Mr. Oldfield when he found him to blame for it. He called two of his black gendarmes.

"Stick that man in the brig!" he roared. "Throw him into the jug! Drag him out of bed and lock him up until I give further orders!" Then to us—"It is against the law here for a taxi driver to be late."

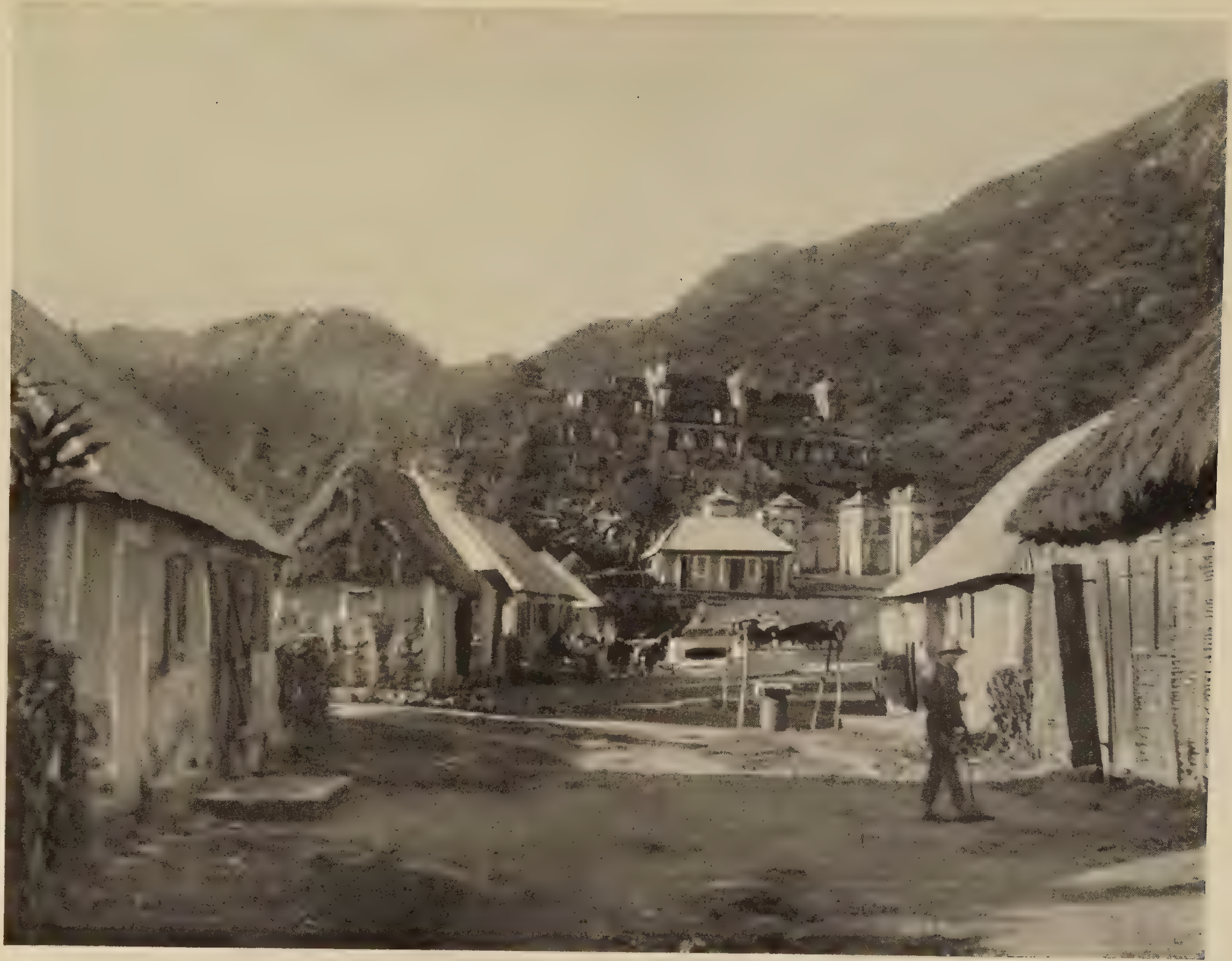
We remembered all the dead little pigs which Barney had slain the day before. There was something rather satisfactory about the thought of him in jail.

Hastily we boarded the small two-seated hand-car which started off snorting and popping. It sped along the narrow gauge tracks toward the base of the mountain, scattering groups of pigs and flocks of hens as it went. At every curve we prepared to jump off in case we should meet the local train but luck was with us and in spite of a stop to repair the drive chain we reached Kilometer 17, where the trail to the citadel begins, just before the train with its four freight cars full of market-going natives came the other way.

At the shelter which serves as a station three gendarmes were waiting with a horse for each of us. Mounting, we made our way over level but muddy paths toward Sans Souci, somewhat over two miles away.

The palace of Sans Souci was built during the reign of Henri Christophe, the negro Emperor. He was born a slave in 1767 but when the natives revolted against the French he rose to the position of chief and later, in 1803, he became sufficiently powerful to proclaim himself Emperor.

Ignorant, uneducated, some think insane, this ex-slave boy who could not even write his own name, aspired to become the greatest monarch of the world. Well-equipped with power and money, he called in skilled advisers from all parts of the globe and following their advice he built his home near the small village of Milot. As it stands today the ruined palace still bears testimony to the pomp and splendor which once was Christophe's. It is a monumental building of red stucco embossed with marble, crowning a precipitous hillside above the



The Ruins of Sans Souci Overlooking the Poverty-stricken Village of Milot

town. The approach from the level plain below leads through a great gateway with pillars thirty feet high. We crossed a square courtyard and climbed a heavily balustraded double flight of marble steps at the top of which yawns a great doorway enframed by a magnificent portico of Doric columns. Unfortunately all the floors on the inside have fallen through. The palace is a shell, but we have written testimony of its glory at the time when Christophe was at his zenith:

"On a day when the Court received the sight was indeed gorgeous. It was compulsory that all nobility, all civilian and military officers should attend and invariably in the uniform of their station. They would pass through the gates, climb the grand staircase to the terrace where the Court waited.

"With the King and the Queen, the Prince Royal and the Princesses, there were the members of the Royal Household; the Grand Almoner in his robes, for he was also Archbishop of Haiti; the Marshal of His Majesty's Apartments; the ten Governors of Palaces; the ten Governors of Castles; the sixteen Chamberlains; the twelve Knights and the seven Grand Huntsmen; the seven Professors of the Arts and Sciences; the Grand Master of Ceremonies with his assistants; the physicians and apothecaries, the pages and heralds.

"Even more numerous was the Military Household of this black King. Of the four Lieutenant Generals, three were Dukes, the Field-Marshals and Major Generals all had the rank of Barons. And there were any quantity of mere Colonels, Lieutenant-Colonels and Captains.

"The Queen too had her Household; her Lady of Honor, her Lady of the Presence and her Ladies of the Palace. Even the Prince Royal and the Princesses had retinues of their own. Always with the Prince was his tutor—the Baron de Vastey who was also one of the King's secretaries; an important person at Court, and writing books which the king had printed in his own Royal Printing Office."[1]

Can you imagine such a scene among people all as black as the ace of spades!

Even his title of King, his palace and his formal court did not appease the black ruler's desire for power. He felt that a man of his importance should have a haven for retreat in time of danger, a strong and solid castle from which he could defend not only his Court but also the harbor, in fact an impregnable fortress. After a conference he instructed his English architect to build on the mountain top back of the palace the strongest citadel in the world; a fortress which under no circumstances could be captured. And thus came into being La Ferriere, the massive and perfectly useless Citadel which even today is as sinister and gloomy as one could wish a dungeon-fortress to be.

One of the famous stories of the Citadel tells how Christophe accomplished the transport of the many heavy guns. To each gun, it is said, he harnessed one hundred men. Riding a thoroughbred horse he followed as the sweating crew dragged their heavy burden over the rough ground. When, exhausted, they attempted to stop for a rest, Christophe calmly drew his gun and shot ten of them, thus spurring the remaining ninety to redoubled efforts. Sometimes there were only sixty or seventy men left in a crew when the gun reached the top.

We climbed the winding trail to the summit in the hot

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[1] Quoted from *Black Haiti,* by Blair Niles, pages 267, 268.

The Rusted Guns in Christophe's Citadel

sun, and through the treetops caught our first glimpse of the gigantic rounded prow of the fortress, a massive pile against the sky. Back from the prow loomed the rest of the Citadel about four hundred feet long and ninety high. We dismounted and entered the damp gloom of the interior. The walls are from four to fifteen feet thick and are honeycombed by innumerable galleries. Such a vast block of masonry required enormous amounts of material for its construction, yet every stone and brick had to be carried up the mountain side. No wonder the natives hated their Emperor.

The King's apartment fronted on an enormous flagged terrace beyond the edge of which is a sheer drop of over one hundred feet. Christophe took pride in the perfect discipline of his troops. A visitor of importance had made a remark to the effect that the bodyguard of a certain European King was exceptionally well drilled. At once Christophe invited the visitor to watch his own crack company at their drill on the big terrace. The King, seated with his retinue on a raised dais, gave the orders which the company were to carry out. With remarkable precision they marched, wheeled, shouldered arms, and executed the most complicated maneuvers to the unfeigned admiration of the visitor. Not satisfied with this display, however, Christophe ordered the whole company to face the parapet. "Forward March!" came the terse command. In perfect step the company approached the parapet and as the first line reached the edge the King calmly turned to tell a joke to his visitor. The latter gave no answer, for horrified beyond words he saw the whole unfaltering company march over the brink to their deaths in the yawning chasm below.

As we looked over the parapet where so many persons had perished the chill north wind brought a damp cloud to encircle us. The castle which had seemed so alluring at a distance of twenty miles now appeared oppressive. We peered uncertainly into the rotting dungeons half expecting to meet the ghosts of those poor devils who had been in chains there. Suddenly from some inner chamber came a muffled gunshot—then another—and then a whole volley.

"Who's shooting?" said Colonel Henley. "None of the natives are allowed to have guns!"

The explanation came a few minutes later—Schmidty and Walt emerged from a dark, ruined gallery each with a smoking gun in one hand and a dead bat or snake in the other. They were probably the first people in a long while to find any use for the great citadel.

"This is a wonderful place to get specimens," they said enthusiastically.

We ate lunch in a drizzling rain which chilled us to the bone. Afterward we mounted our undersized horses and made our way to the warmth and sunshine of the valley below. I, who am anything but a good horseman, had walked much of the way but for the final two miles I remounted in order to "come in strong" at the finish. As we approached the station a throng of natives who had disembarked from the evening train were making their way to Milot. Just as we met them my wretched horse stumbled so badly that I fell head first into a deep mud-puddle. I became painfully aware that the natives have a much better sense of humor than I had given them credit for.

On the following day we made one more early start and after thirteen weary hours of travel through rain and mud, and after nearly plunging over the mountain side because of a broken steering gear, we reached Port au Prince and better still our bunks—without cockroaches, on the *Illyria.* On the same day Cornelius had flown by airplane from Port au Prince to the Cape and back again in two hours' flying time. In spite of the fact that the plane had to ascend to 13,000 feet to get above the clouds and although there is no worse country to fly over than Haiti, he was probably safer and more comfortable in the air than we were with ex-convict, Barney Oldfield.

CHAPTER III

IN THE JUNGLES OF PANAMA

THE four day voyage from Haiti to Panama was filled with difficulties for the *Illyria.* The miserable generator, too small to bear the heavy drain upon it, broke down again and the refrigerating system and the galley stove quickly followed suit. As a result six hundred pounds of meat stored in the ice box became so rotten that when the second cook went to throw it overboard the fumes overcame him and he was unconscious for six hours. Numerous other small troubles developed. We comforted ourselves with the knowledge that Cornelius had ordered by radio a new generator, a galley stove and an engineer who knew something about ice-machines. All these were to be waiting for us at Panama.

Our plan was to go through the canal as quickly as possible and to have the repair work done by the Canal-Zone Commission at Balboa on the further side. We arrived at

Cristobal on the Atlantic end of the canal early in the morning. We hove to, expecting the pilot, for whom we had radioed, to come aboard. There was no sign of him. After vainly waiting for an hour Cornelius and the Captain went ashore to find out what was the matter. They discovered that the new generator, which had already arrived, was of such enormous proportions that the government officials had thought it our main engine. Consequently, instead of forwarding it to Balboa, they had prepared to install it in the boat at Cristobal to save us towing charges through the canal.

It took so long to clarify this matter and to get the generator shipped by train to Balboa that we were not ready to enter the Canal until afternoon.

Since darkness overtook us on Gatun Lake we missed our chance to see the famous Culebra Cut. However, the coming of night did make us witness one interesting scene which the people who go through the canal by day never see; namely, the nocturnal operation of the locks. The three long rows of double electric lights which mark the sides and the center of the locks are brilliantly reflected in the black water below which seethes and boils as the level changes. The reflections dance and glimmer like many-faceted jewels. Perched on the upper crosstrees and the yardarms we could look down into the locks as if into enormous garden pools while the sturdy little electric locomotives which pulled and guided us seemed like toys carelessly left by some child to run all night on the brink. Even by daylight the canal is a practical example of magic but after dark when the many concrete walls, softly lit by the myriad lights, stand out against the blackness of the night like old marble; when the guard chains grow taut or slack away without any visible human agency; when at just the right moment the enormous water gates smoothly open as if to the command of Ali Baba; when a heavy ship is quickly lifted thirty feet, then one feels that Jules Verne himself has been outdone.

The next morning, after winding up the necessary arrangements with the Canal-Zone Commission, the *Illyria* was brought alongside the government dock. A large crew of men descended upon her and started work. Apparently bent on disassembling the ship into as many pieces as possible, they soon had parts of her strewn all over the dock. The confusion became so baffling that we could no longer live on board, so we moved out and took rooms in a hotel in Ancon, some two miles away. There we stayed for nearly three weeks until the multitudinous repairs were finally finished.

The Americans in Panama live a gay life and are proud of it. We soon found ourselves engaged in such a round of teas, dinners and dances that we hardly dared to utter the words "scientific expedition." It must be confessed that some of us began to weary of this endless celebrating and when Schmidty offered a trip to Barro Colorado Island, Murry and I jumped at the proposal. Cornelius had to stay in Panama City in order to oversee the harrowing operations being performed on the *Illyria.*

The Barro Colorado Scientific Laboratory on Barro Colorado Island in Gatun Lake is maintained by the Institute for Research in Tropical America and is open to visiting naturalists of all branches. The island is of particular interest to scientists because of the untouched tropical jungle-growth which covers it and because of the great variety of animal life which concentrated there when the adjoining lowlands were flooded as the water-level of the lake was raised for the canal.

Mr. Zetek, the Resident Custodian of the Scientific Laboratory approved of Murry and myself as "visiting naturalists." He secured free passes for us on the railroad to the station of Frijoles on the canal some thirty-five miles from Panama City. From this little station we had to walk only a hundred yards to the shore of the lake. A tiny outboard motorboat was waiting for us with a native pilot who was to ferry us across to the island. Unfortunately, besides the three of us with our heavy cameras and scientific equipment, there had arrived on the same train a botanist from Harvard with *his* luggage. In addition there were five cages of live animals which had been secured for me to photograph.

Even though we left a large part of our equipment at the station, it was discovered when we had all managed to crowd ourselves into the boat that we had only an inch of freeboard. As might have been expected, a portion of each wavelet found its way over the gunn'ls and we had to put back to port. Borrowing a dugout canoe from a native we loaded it with all the luggage, the five cages of animals and myself; a very heavy cargo. Towing the canoe the motorboat managed to reach the middle of the lake without difficulty. Then a wanton wind blew up white caps of alarming size. Those in the boat managed to shield themselves with pieces of canvas from the drenching spray but in the canoe I had a worse time of it. The frail craft was soon half full of water and all the luggage was soaked. As the water rose higher inside the canoe the animals in the cages found themselves in danger of drowning and gave vent to a variety of grunts and howls. Fearful of losing not only the animals but also our clothes and the cameras, I bailed furiously. Had we not soon reached the smooth water behind a sheltering point I believe the whole outfit would have gone to the bottom.

The Laboratory consists of a cluster of neat frame buildings in a clearing on a jungle hillside some hundred feet above the water. The only approach is by 137 concrete steps up which we had to carry all our luggage. At the top we were met by an old friend and colleague of Schmidty's, Dr. E. R. Dunn.

One of the animal boxes which had escaped a wetting on the lake contained about two dozen basilisks, a type of lizard about eighteen inches in length which is remarkable for its ability to run on the surface of smooth water. Schmidty had been at great pains to secure this collection in the hope of making a moving picture of their marathons. As soon as we had changed into dry clothes we took the basilisks down to the water and let one go.

Running along the float with surprising speed, the creature took a mighty jump into the water, but then instead of skimming along on the surface he dove below and at once disappeared. A second one did the same thing, first biting Schmidty severely on the end of the forefinger.

Since the remaining lizards seemed to be much weakened by their captivity we decided to release them all at once, in the hope that at least one would stay on the surface. We did so with the movie camera in full operation but not a single basilisk complied with our desires. This was all the more maddening in view of the fact that the lizards remained in

Photo by M. N. Fairbank

Schmidty and the Author Making a Movie of an Iguana: Barro Colorado

the cove for several days and amused themselves each morning by scampering about on the water as we had wanted them to do. However, the instant we approached they dove out of sight.

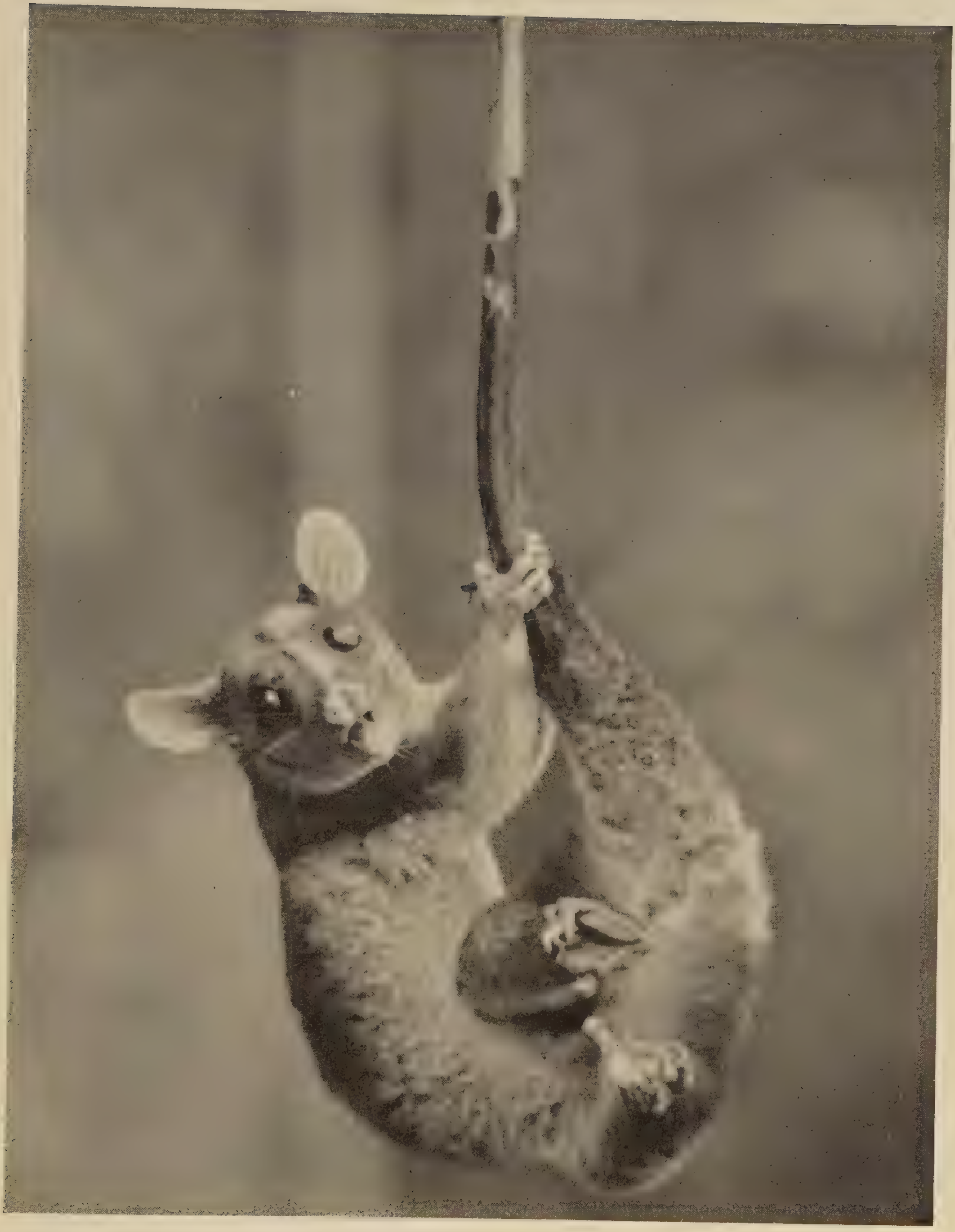
That evening while we were sitting at the long supper table swapping yarns with Dr. Dunn, we were suddenly startled by a burst of prolonged guttural howls that came apparently from a point directly above us. Rushing outdoors we scanned the nearby tree tops. The howls, a combination of a dog's bark and a pig's grunt redoubled at our appearance, so we had no difficulty in locating their source. Silhouetted against the evening sky, perched in the spreading branches near the top of a gigantic jungle tree were nearly a dozen monkeys.

These howlers, as they are rightly called, seldom visit the outskirts of the forest, so we were fortunate to have seen them on this tree. They are about four feet long, not including their marvelous tails, and dark brown in color. Through our glasses we could see clearly the babies hanging from the bodies of the females. Slung close under the bellies of their parents they in no way interfered with the agility with which the latter climbed about the trees or swung by their tails. Some of the large offspring were allowed to leave their refuge at such times as the mother judged prudent and to climb about a bit. But when we rapped on the tree trunk the little ones flew to their parents and the whole troop went swinging off through the tree tops, turning to scold us in a prolonged chorus of bloodcurdling howls.

For a single day this was enough excitement for me. No sooner had it grown dark, however, than Schmidty and

Dunn bundled up in heavy boots and shooting jackets. They fixed bright carbide lights to the front of their hats and stumbled away into the dark, slimy maze of twisted vines, gnarled roots and buttressed tree trunks which make a tropical forest almost impenetrable at night. Hardly had the flicker of their lights disappeared in the gloom than a tropical rainstorm began to beat down on us so fiercely that we half expected to see them return at once, but for over two hours there was no sign of them.

Finally toward midnight, they stumbled, all bedraggled and wet, into the camp, looking like a couple of fugitives from justice. Only the excited glitter in their eyes betrayed the fact that they were not as discouraged as they appeared. From their little collecting bags they first dragged an alligator about four feet long, which Schmidty had shot just after he had unwittingly stepped on a much larger one. Then out came a live turtle which tried desperately to bite everyone within reach. The next exhibit was an enormous tarantula, alive, four inches in diameter, from those deadly fangs we all shrank until he was popped into a cage. The greatest find of the evening had been reserved for the last. Dunn, proudly reaching into his bag brought out a most amazing frog, about three inches long. Its triangular body and limbs were a luminous shiny dark green above and very bright orange below; while its enormous round eyes shone like jewels. Schmidty jealously admitted that it was an unknown and new species. Dunn explained that as this frog nestles against some green leaf he covers up all his orange colored parts, and is almost invisible. But if he is disturbed he takes an immense leap, flashing all his orange underparts at the observer who,



Small Opossum, Swinging by His Long Prehensile Tail: Barro Colorado

seeing nothing but that color, hardly thinks of looking for a green frog where the orange one alights. Here is a case where the brightest of contrasts is the best possible camouflage.

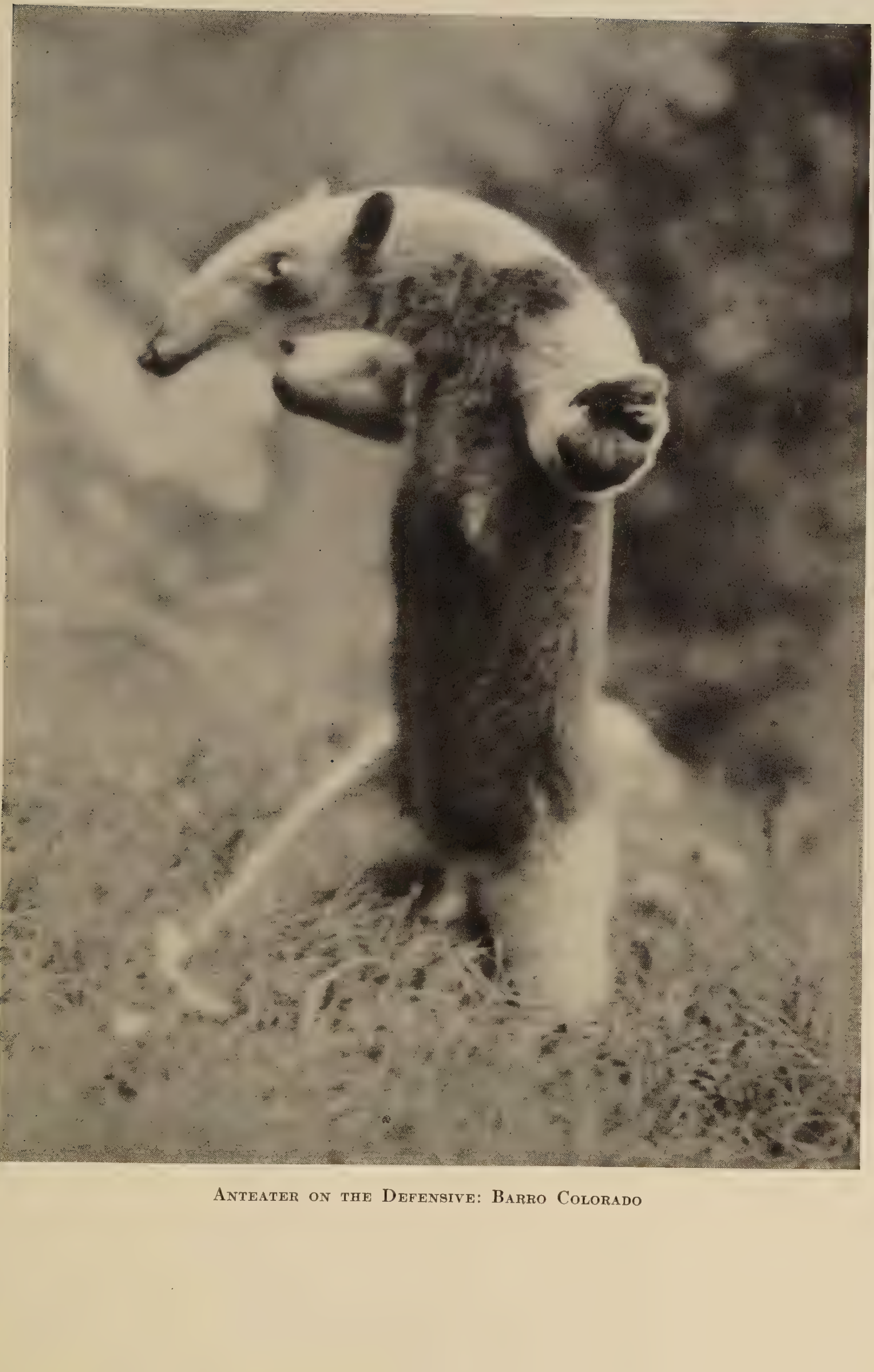
The next morning, although weather and light conditions were not of the best, we set to work at the difficult task of photographing the animals which had been collected. Our first subjects were two hairy tarantulas; one that I had caught at three A.M. that night, much too near my bed for comfort, and the other, Schmidty's find of the preceding evening. When released from their cage, though still tied by threads they rushed forth frantically, trying to sting everything within reach, but after a while became so exhausted that only a severe prodding would make them move. Apparently their endurance is very slight. Their bite is fatal to small animals but in the only careful experiments known, the bite of related species had little more effect on a human being than the sting of a wasp.

Then we uncaged a small arboreal porcupine who proved more tractable than the tarantulas for once he had gained the vantage point of a small tree he made no effort to escape. With his long prehensile tail he swung about very nimbly. Apparently there is one enemy against which the porcupine quills are of no avail. Some small red ants swarming about the tree trunk attacked our friend and caused him to wriggle and scratch so furiously that we took pity on him and put him back into his cage.

The next exhibit consisted of three small woolly opossums with piglike snouts and large protruding eyes for night vision. These marsupials, also, had prehensile tails. By them they hung from branches as if dead when we first released them, but the instant we moved away from the tree they dropped to the ground, came to life and scampered off into the underbrush. Schmidty and Frank each caught one and Schmidty, running true to form, succeeded in getting his knuckle badly bitten by the sharp teeth of his captive. It was a long time before we could induce them to remain in the tree long enough to have their pictures taken. We were especially interested in the opossums because they are distantly related to the cuscus and the tree-climbing kangaroo, both of which we later found in New Guinea.

After lunch we brought out our prize specimen, a full grown anteater. He had evidently been considerably irked by his captivity for when Schmidty hauled him out by the tip of his long tail he quickly reversed himself, climbed up that appendage and made a pass with heavy claws at his captor. When Schmidty dropped him, at once this queer animal, grunting and puffing like a small steam engine, made a dash for the herpetologist and shredded his trouser leg into small bits. Schmidty, crying loudly for help, fell to the ground in convulsions intended to shake off his adversary and continued kicking until Frank Wonder pulled him off. All this time I had been gleefully grinding away at the movie camera and a most humorous picture resulted.

After this we treated Mr. Anteater with more circumspection. We wired him by the hind leg to a tree and left him to cool down. Whenever we approached he reared onto his hind legs and tail and extended his muscular forearms in the position favored by boxers. In this defensive attitude, darting his long round tongue in and out, grunting, puffing and blinking his beady eyes he was one of the drollest animals I have



Anteater on the Defensive: Barro Colorado

ever seen. Later we brought him a termites nest, over-flowing with light brown insects and stuck it under his long nose. The sight or smell of the termites made his mouth water copiously but he obstinately refused to eat. It was only after two hours of patient waiting beside the movie camera that I was able to film him in the act of darting out his sticky tongue to a length of five or six inches and quickly sucking it in again, with several unlucky white ants attached. So quickly did he manipulate his tongue that it was only a blur to my eye. Consequently his small prey had not the slightest chance of getting away. He finished his meal speedily and curling up into a hairy ball with his forepaws crossed over his head he went off to sleep, looking more like a harmless teddy-bear than a vicious trouser-shredder.

The next day more visitors arrived. One of them was Dr. Chapman, Curator of Ornithology at the Museum of Natural History in New York. He has on Barro Colorado a small house of his own, some fifty feet from the main camp, where he stays several weeks every year studying tropical bird life. He showed us some remarkable flashlight photographs which he had induced the wild peccaries and ocelots, which abound in the jungle around the camp, to take of themselves by tripping a set-camera and flash-gun.

While we were admiring these masterly photographs a native boy came running into the camp dragging behind him a spiny-crested green lizard about four feet long. It proved to be a giant iguana of the type which is common in Central America. We had already seen several sunning themselves on the tops of high trees or clinging to branches overhanging the lake, but whenever we had come near them they had jumped to the ground or water below and run or swam away. A leap of fifty feet onto hard ground is nothing for them and when they are in a hurry they can run much faster than any man. Consequently we were highly pleased to get a captive and at once set about taking movies of it. With its hard green scales, its reptile head, its tail and claws, and the spiked fringe on its back, it looked very much like a small but fierce dragon. We had to be very careful to avoid being bitten. Later we put this iguana into the water in the hope that he would swim for us. Schmidty said that he would use his body and tail rather than his legs for propulsion. Unfortunately, he sank to the bottom and drowned. As we had seen plenty of the iguanas jump from trees into the water we concluded that this one must have been injured, or he would not have succumbed so easily.

Later in the day there was another set of arrivals. Three large amphibian aeroplanes with United States Army insignia on their wings circled low over the camp and came lightly to rest on the Lake just inside the main channel where two rusty cargo steamers were ploughing past. When we sent out a boat in response to their signals six passengers came ashore. They ascended the 137 steps and were welcomed by Mr. Zetek. They were none other than Captain Patterson and his daughter Alicia of Chicago, cousins of Cornelius, Floyd Gibbons, the newspaper correspondent, and three army pilots. They had come to Barro Colorado to see the camp and find Cornelius.

They did not find their cousin, but they took a walk in the jungle. Dr. Dunn led them along one of the winding trails for some distance. In pointing out the characteristics of the tropical forest, he explained to Mr. Gibbons, in a matter-of-fact way, how the hanging vines attempted to squeeze the life out of the trees which in turn tried to smother each other by shutting off the sun. When the party returned to the camp Mr. Gibbons gave us a vivid account of what he called "the eternal struggle for existence of the jungle growths." So accurately did he draw the picture that Dunn blinked with astonishment for he knew that Gibbons had never seen a real jungle before. Afterward Dunn confided to me:

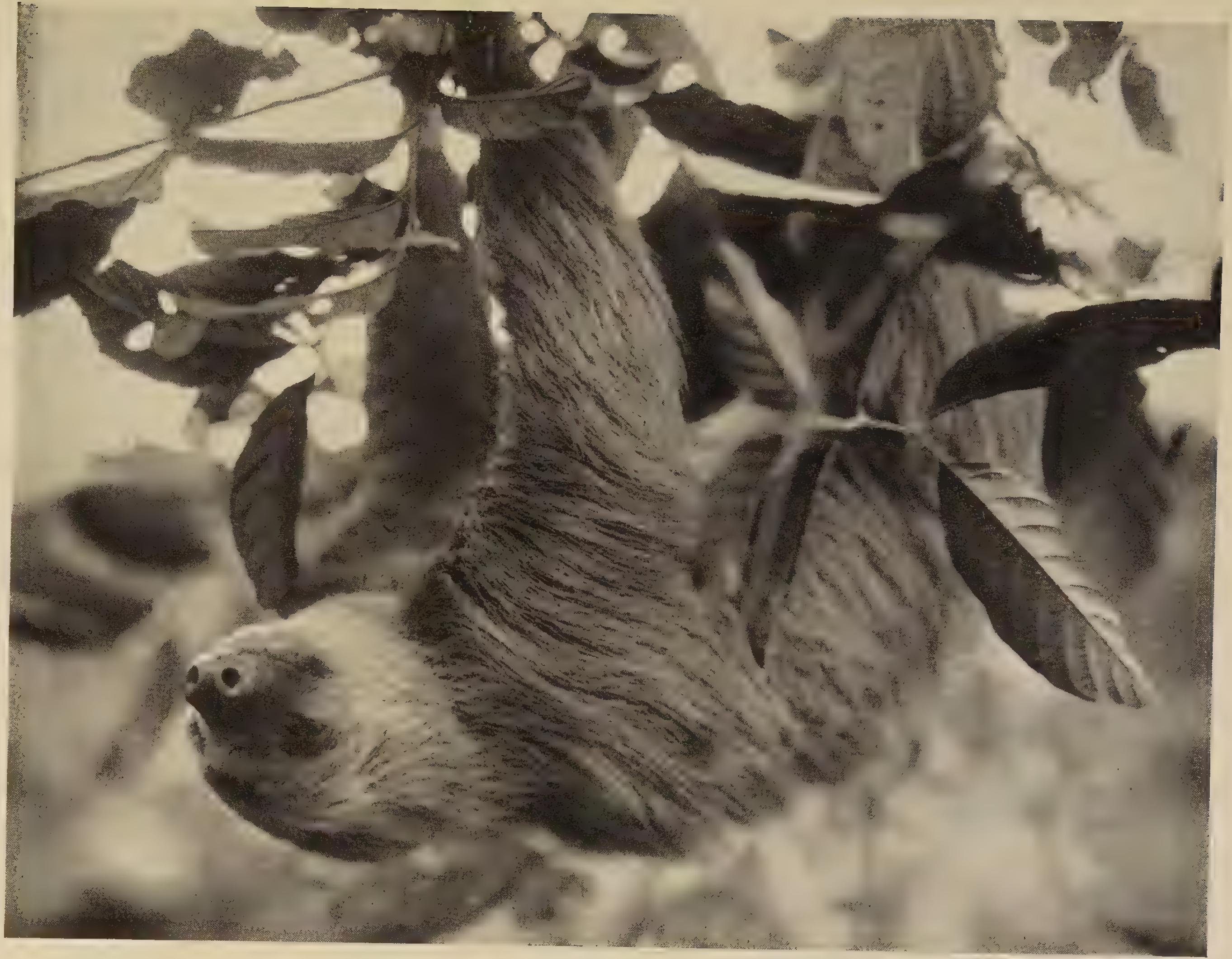
"You know, I thought I was boring them to death with what I said about the jungle so I was much surprised when Gibbons gave a better description after fifteen minutes than I can after studying it for fifteen months. My respect for newspaper correspondents is doubled."

Next morning we photographed a three-toed sloth, a very queer animal. Weighing about twenty-five pounds it much resembles a dog with shaggy fur, protruding eyes, and long stiff legs each provided with two hooked claws. These animals are so extremely low in intelligence that their reaction to any stimulus is very much delayed and at the occurrence of something unusual or even dangerous they make no attempt to move but merely stare vacantly into space with apparently sightless eyes.

Even in the trees their rate of movement is so retarded that they seem to be an example of a "slow-motion" picture and when we placed one on the ground he was nearly as helpless as an overturned turtle. The unkempt and shaggy fur was colored green by the presence of microscopic plants (algæ). These were sectioned and examined with great interest by the Harvard botanist, Dr. Weston. The sloth's head with its beady eyes and foolish mouth resembled that of a monkey and to turn it from one side to the other took him more than five seconds. It would be hard to imagine an animal less intelligent. In fact the survival of such an archaic type can be accounted for only by the fact that for eons there were no large carnivores in South America to exterminate it.

The following day brought me many varied experiences. Early in the morning we went for a paddle in the backwaters of the lake and watched the cormorants diving for fish and the startled iguanas as they leapt from the overhanging branches. Then with Schmidty and Murry I walked several miles into the very heart of the jungle where everything dripped moisture and all kinds of dank vines, nettles and creepers hindered our progress. Strange brilliantly colored birds flitted amongst the heavy foliage and whole armies of enormous ants ran in orderly processions across our trail. Wild peccaries and coatis fled silently away and we expected at any moment to see a stealthy ocelot or the gray form of a puma.

Slipping and sliding through muddy depressions and tripping over aerial rootlets we at length came to a small clearing over which towered a gigantic silk-cotton tree. Its enormous light brown trunk was fully fifteen feet in diameter thirty feet from the ground and below that point the trunk spread out into numerous buttresses. Some of these flanges had grown together again so that they formed pockets where pools of stagnant water had collected. These were the home of large black tadpoles. Dry recesses between the buttresses were hung with tiny bats. Above its impressive base the trunk of this tree towered to a height of approximately seventy feet



The Three-toed Sloth in his Native Element

without a single branch. Beyond that point it spread out like an enormous umbrella. From the wide-spreading limbs hung trailing vines and aerial plants, which, paralleling the trunk, gave a perpendicular and soaring effect to the whole. This occurrence of scattered single trees of much larger size and height than the average is typical of all true tropical forests and we observed the phenomenon on many islands widely scattered on the broad Pacific; but we never again saw such a giant tree as that one.

It was the end of my stay. Packing the equipment and some two thousand feet of exposed film I descended to the flimsy outboard boat. It ferried me safely to Frijoles where the afternoon train picked me up and bore me with great speed to Panama. I arrived at a late hour, hot and tired, but at the Hotel I found that Cornelius was counting on me for dinner with his cousin Alicia and others, after which we were to go to the opera. I climbed into evening clothes and a boiled shirt and was rushed to the Club where we descended on the dinner party in the middle of the second course. From there we made a mad dash to the theatre at the other end of the city and I who had been for a week in khaki pants on a tropical island floundering about in mosquito-infested swamps, found myself dazedly sitting between two pretty girls in evening gowns listening to an amateur version of La Boheme. Shipwrecked mariners rescued by a modern ocean liner must experience somewhat the same feeling.

There followed a week of the utmost confusion. Our motion pictures had to be developed, printed and spliced for a test showing. The last letters for three months had to be written. Clothes, ammunition and other important articles had to be bought. The many animal and bird specimens obtained at Barro Colorado had to be prepared and shipped. And last but not least, everything on board the *Illyria* had to be taken out and aired to prevent moulding.

Cornelius and the Captain were overseeing the reconstruction of the ship and to their credit be it said that afterward we had no more of the troubles which had so delayed us. Not only were generator, galley stove, and ice-machine replaced but the decks were recaulked, much of the rigging renewed, stores restocked, shelves put in the staterooms, a new outboard skiff constructed and the laboratory partially rearranged. At the same time they engaged two new engineers, a new steward and a new sailor.

Besides this routine work we made two attempts to hunt crocodiles during our last week in Panama. The first expedition was literally a wild goose chase. Five of our party and three army officers started in our launch early in the morning along the coast. We were headed for the Cayemite River, fifteen miles away. Although one of the officers had guaranteed to pilot us, we somehow missed the mouth of the river and continued along shore for thirty miles until we finally struck another opening. Nobody knew that this was not the Cayemite. So we cruised up it some ten miles keeping a careful watch for crocodiles. Since there had never been any in that river it is not surprising we did not see them.

Fortunately there was abundant wild bird life and when we turned back discouraged and no longer preoccupied with visions of the large reptiles we concentrated on it. Various small rocky islands were the breeding and nesting places of thousands of frigate or man-o-war birds and hundreds of pelicans, cormorants, and boobies. As we approached some barren rock protruding abruptly above the surface of the sea literally thousands of these giant black birds with their white breasts and long forked tails would soar high into the air, like bees over a hive. If we came too close to their nesting places they would descend upon us with the velocity of meteors until suddenly checking themselves just above our heads they would fill the air with horrid cries. Their swooping maneuvers were plainly intended to drive us away. Then as we passed by the danger zone they would mount again with a few easy strokes of their powerful wings until they became mere black specs hung from a cloudless blue dome.

At other times we saw frigate birds fishing. Their speed enables them to seize a flying fish in the air but they seldom lower themselves to doing their own work. Instead they lazily circle until some poor booby laden with freshly caught fish for its family passes below. Then some piratical old frigate will swoop at the defenceless booby forcing him to drop his burden. With a lightning dart the agressor seizes the fish before it ever reaches the water, gobbles it down and regains his lofty position, ready again to pounce on an unwary traveller.

On some of the bird-rocks all the best nesting places had been pre-emptied by the gawky pelicans. Everyone is familiar with the appearance of these lengthy birds whose "bills hold more than their bellies can," but really to appreciate them one must see them flying. They are probably the most unwieldy birds in the world. Instead of putting his head forward the pelican flies with his neck bent upward and his huge bill inclined down at an angle of forty-five degrees with the horizon. His great wings beat the air slowly but with a jerky desperate motion as if they were barely capable of sustaining him. It is only with difficulty that he can alter his course to either side while to move upward is plainly a tremendous undertaking. The pelican is at his best once he gets well under way for then he can glide for a long time with only an occasional wing stroke and sometimes he skims along so close to the water that his wing-tips touch at every down-stroke and one feels that at any moment the flight will end in a big splash.

The pelican has two ways of diving from the air and both of them are funny. When he wishes to dive from a considerable height, say sixty feet, he suddenly doubles up like a jack-knife, his bill pointing straight down and his wings almost completely folded. In this position he falls like a projectile and, hitting the water at tremendous speed, he vanishes for a considerable period, the spot of disappearance being marked by a small geyser of water and spray. On the other hand, when our friend is flying low, ten feet or less above the surface, if he wishes to dive, he does not go to all the trouble described above but simply stops flying, and striking the water with wings half spread he bounces along on the surface like a seaplane making a very poor landing. At the same time he thrusts his beak into the water and soon fills it with the small fish he has stopped for.

Our second crocodile hunt was in a measure more successful for we engaged a native pilot and actually found the mouth of the Cayemite River. At a small native village we hired five native canoes with paddlers and, embarking with our cameras and rifles, set out up the river on the muddy water of an incoming tide. Silently but swiftly we plunged into the dense

Cornelius, Chuck and Dr. Moss Searching for Alligators on the Cayemite River, Panama

jungle of mangroves and other swamp trees. On rounding each bend we eagerly scanned the river for crocodiles, whether swimming or sunning themselves on the bank. Since we were all armed with high power rifles we made an effort to keep abreast of each other to avoid any chance of an accident. Our eyes were so unaccustomed to the sight of swimming crocodiles that for a long time we did not get a shot. Every now and then our guides would excitedly whisper "Lagarto! Lagarto!", but by the time we looked where they pointed nothing was to be seen but a few bubbles borne along on the surface.

Finally about thirty-five feet from Chuck's boat I saw two cold gray eyes and the tip of a snout. The forests echoed and reechoed as Chuck fired at this tiny target. A small geyser of water just beyond it showed a miss. Almost before the bullet struck the quarry had ducked below with a great upheaval of the water about him and we saw no further sign of him.

Further along we glimpsed several more pairs of eyes which, even with their raised sockets, protruded above the water level less than two inches but our shots seemed to have no other effect than to cause the immediate and complete disappearance of the animal fired upon. However, after several miles of failures we came to a sort of woodland pool some two hundred feet across where the river lingered for a while on its otherwise swift course. Here we saw more crocodiles at once than at any other place on the whole cruise, even including New Guinea.

The water was alive with them, five or six being sighted at the same time. The shooting sounded like a battle and I had quite a hectic time operating alternately my two cameras and my rifle. Our five guides broke into uproarious laughter for they probably had never before seen so much shooting and certainly never so many misses.

Before long both Cornelius and I knew we had scored hits, for the animals fired at threw their heads into the air and made several wild splashes before sinking. Unfortunately for Schmidty who badly wanted specimens, once the muddy waters closed over their heads we never saw them again. We had been told that if a crocodile is knocked senseless by a direct shot to the brain it will float long enough to be picked up but whether this was untrue or whether our shots were not in the right place, we could not ascertain.

We scared away in this fashion all the crocodiles of the pool, including one so enormous that as he swam on the surface he made a wake equal to that of a small motorboat. These harassed saurians must have warned all their friends of our approach for as we continued upstream we saw no more of them. Before long a very heavy rainstorm forced us to return to the launch wet and empty-handed. We left Panama without securing a single large crocodile.

CHAPTER IV

COCOS

IN the meantime the *Illyria* was fast being reassembled and on the 29th of December we found ourselves ready to continue westward. We closed the portholes and made everything ready for our long voyage. At three o'clock, as the Captain gave two blasts on the whistle, the *Illyria* swung away from the dock into the canal and between two huge tramp steamers slipped quietly out onto the broad Pacific. Our last glimpse of American territory came at sunset when the volcanic hill of Balboa, lit by the sun's red rays, stood out weirdly purple against a darkening sky and the long lines of lights which mark the canal's entrance twinkled red and green like those of a railroad yard at night.

The air over the Pacific was cool and dry, and the water continuously smooth, so cruising was peaceful and fairly free from seasickness.

On the third day out the first excitement occurred. We were sailing along under a light breeze when of a sudden the sailor on the masthead shouted "Submarine to starboard off the stern quarter!"

We reached for our glasses and observed on the horizon a dark spot round of outline, except for a small projection on the top. The Captain rejected the submarine theory and declared it to be an overturned lifeboat with a man sitting on it. With much flapping of canvas and bracing of yards we headed into the wind and put about in its direction. By this time every man on the ship was on deck or in the rigging. I loaded up all my cameras in expectation of great events.

Closer approach proved that not one of us had guessed right. The floating object was a dead whale, large enough in life, but now distended by the gases of decay to an enormous size. Its flank floated fully five feet out of the water and one fin stuck up almost straight into the air. Around the carcass the water was literally alive with enormous sharks and other carnivorous fish. We could see that great scoops had been made in the solid blubber by their powerful jaws and from the many fins that dotted the water's surface in that vicinity we knew that a host of these scavengers were at work. At times fifteen foot albacore and monstrous barracuda would leap clear of the water, glitter for a moment in the bright sun and then fall back with a tremendous splash.

The *Illyria* had been headed into the wind and soon lost her headway so that we drifted within a hundred yards of the stinking carcass. At this close range we could see numerous small sea birds fluttering about. Orders were given to lower away the new skiff for the purpose of collecting some of these as specimens. While this was being done sharks of all sizes

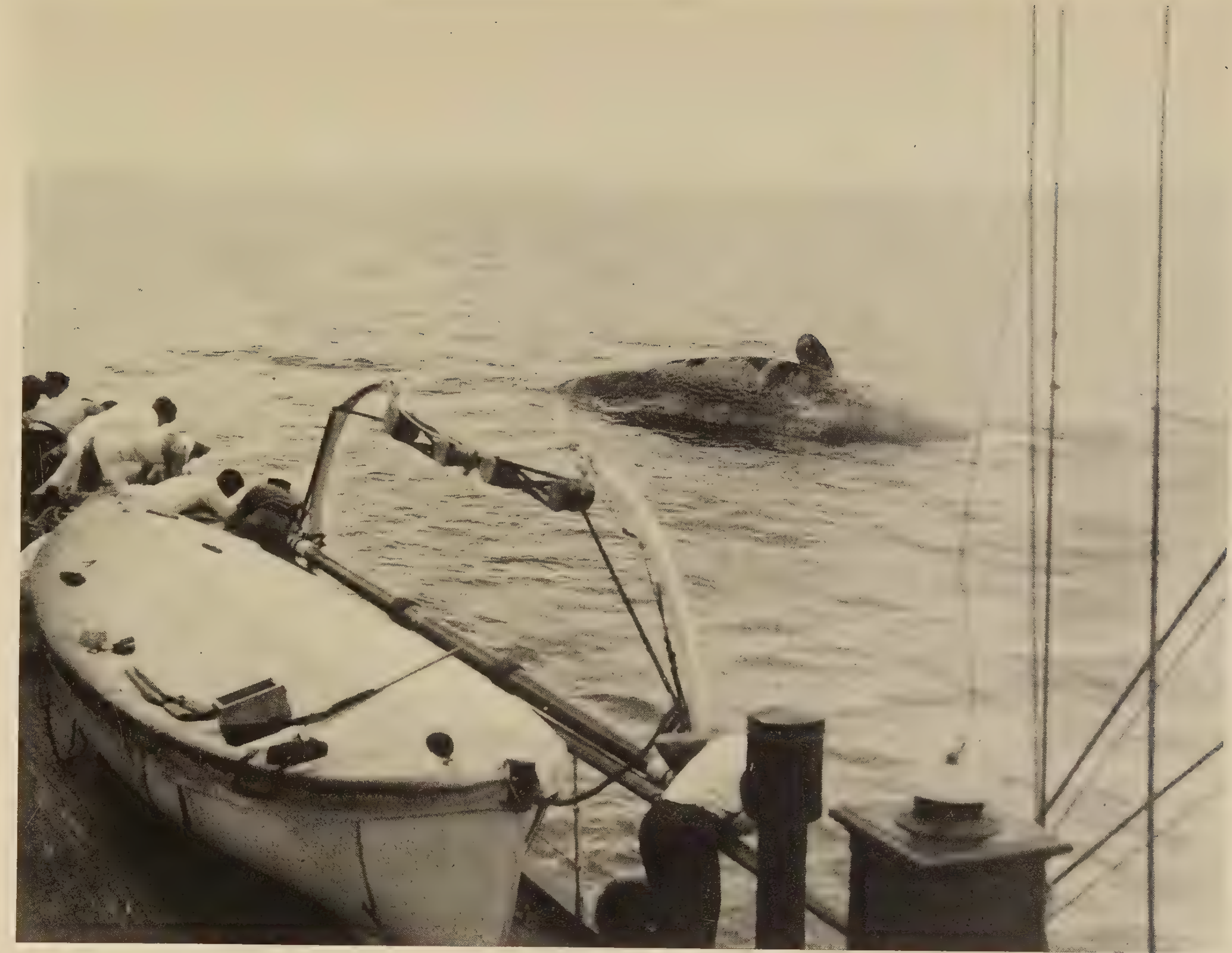


Photo by M. N. Fairbank

All Hands at the Rail

The crew of the *Illyria* catching a shark near the floating carcase of a sperm whale

surrounded the yacht. Since the bright blue water was exceptionally clear we could see to a depth of fifty feet and on each side of the ship eight or ten of these voracious fish were visible.

We soon had a line over the side and hardly had the bait struck the water than it was seized by a hungry monster and carried away, hook, leader and part of the line. At the same time Cornelius "nailed" one with his harpoon gun, but the victim, tearing away and reaching the end of his tether, gave such a bound that the harpoon pulled out. With a new and stronger line we made another attempt and soon hooked a shark of fair size. Profiting by our previous experience we played him gingerly and as soon as we got him alongside, Cornelius shot him twice with a Springfield rifle. Even so he thrashed about a great deal before we could get him aboard and Dr. Herre was able to secure only one of the many sucking fishes which had been attached to the body. Later when we measured this shark it was found to be nearly twelve feet in length.

As soon as the skiff was in the water Walt jumped in with his shotgun and a long lance and I with my cameras. Mr. Cook, the mate, volunteered to row us through the danger zone and in spite of numerous attempts on the part of the hungry sharks to bite off our oars we soon reached the whale. To Walt's chagrin the birds flew away and we found ourselves confronted by so odious and penetrating a stench that it was overwhelming even to windward of the carcass. Accordingly we waited only long enough to make a few observations. The huge square head of the whale and the rows of conical teeth showed it to be a sperm whale or cachelot.

On the way back to the ship the sharks pestered us more closely until, exasperated, Mr. Cook lanced three of them in the back. I was afraid that the smell of blood would attract even more of them and that in our small craft we should find ourselves in real danger. Instead they seemed to be discouraged by rough treatment and, slipping away, left us to proceed in peace.

At six the next morning Cocos island came into view, a cloud-capped, dim blue bank on the horizon. It must have been fully fifty miles away for although we ploughed toward it at full speed it seemed to recede almost as fast as we gained upon it and we were unable to reach it until afternoon.

As we neared the green mountainous headlands scores of frigate birds and hundreds of friendly brown boobies came out to meet us. Some of the latter even perched on the rigging or flew so close above our heads that we instinctively shielded ourselves. One boobie was so fearless that a sailor caught it with his bare hands. However the captive put up a strong fight, beating its captor's face with its wings and drawing blood with its beak. It was quickly released.

Like a guard of motorcycle police about the automobile of an ambassador an enormous school of porpoises surrounded the ship and, massing their forces near the bow, escorted us into Chatham bay. Fully a dozen of these creatures swam on each side of the bow breaking water so close to us that the spray wet our faces. Hundreds more gamboled abeam sometimes leaping quite clear of the water. We saw one turn a complete somersault in the air. Two giant rays or devil fish flapped away from our course, a red jellyfish passed under our bow and sharks loitered alongside. Thus royally welcomed by the finned and feathered inhabitants of the island the *Illyria* slipped into the bay and anchored in fine white sand which could be clearly seen at a depth of seven fathoms.

Cocos resembles, roughly, a pile of mountain tops thrust up from the sea. It is three by four miles in size and its shores ascent precipitously from the ocean in a rocky wall. The entire surface is mountainous, steep ravines alternating with ragged cliffs. Unlike the Galápagos group the climate is extremely moist and every inch of land space is fought for by luxuriant growths. Dense green vines cover, at least partially, even the vertical cliffs and one must fight one's way through every conceivable natural impediment to get anywhere. There are many streams flowing from the interior toward the sea and when these reach the rock wall, they cascade or drop sheer away for several hundred feet. It was at the base of one of these waterfalls that we had the adventure which will be related later.

Cocos was first heard of in 1541 but on account of its small size and remote position it was not definitely located for some time after, and has never been completely or accurately mapped unless by treasure seekers. As the centuries passed a few stray ships visited the island for water, cocoanuts and pigs, all of which were abundant. Many of these old seafarers have left their names carved on the rocks or tree trunks. One of the oldest inscriptions is dated 1797.

It was during the decade beginning in 1820 that the deeds were done which were later to make the island famous. Benito Bonito, a blood-thirsty Portuguese pirate, buried on Cocos a collection of loot worth several million dollars, so the story runs. Although he and most of his men were caught and hanged, two of the lot escaped and later circulated the stories which have become more fantastic with each repetition.

Again in the next decade Cocos is said to have received another great fortune in buried treasure at the hands of Captain Thompson of the *Mary Dear* who strangely enough, was one of the two men who had escaped hanging with Benito.[1] This time he had absconded with money and church plate entrusted to him by the inhabitants of Lima, Peru, and fearing himself to be hotly pursued he felt Cocos to be a better hiding place than his ship for the booty.

As a result of these two fairly well authenticated stories Cocos became famous as a treasure island and all sorts of expeditions were started to search for the gold. Of all the earlier expeditions that of a Canadian named Keating had the best information. Keating actually succeeded in locating at least a part of the treasure. Although the crew of his schooner mutinied before he could get the treasure aboard, he and a friend stole away in a whale boat with as much of the gold as they could load during a single night. But before they reached Panama in this frail craft the friend had been mysteriously eliminated. Keating reached Canada with only about ten thousand dollars worth of the treasure. He was strongly, and perhaps rightly suspected of having murdered his missing friend.

After Keating's ill-starred expedition there came many less sanguinary hunters. There were a pair of English women who made two fruitless trips all the way from London. An English peer, an American millionaire, the second wife of Keating, the commander and crew of one of His Majesty's

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[1] *The Arcturus Adventure,* William Beebe, pp. 253–257.

Dr. Herre Measuring a Shark

battleships, several sea captains and many others all had their turns at searching for clues or dynamiting the rocks and digging the hills of this green island. In 1875 one of the sailors from a treasure seeking steamer is said to have discovered a small number of coins when he fell down a ravine and there are other even less reliable stories which tell of the discovery of parts of the treasure.

In 1890 a German, August Gissler, obtained what he thought was authentic information on the location of the treasure and after a great deal of difficulty had himself put ashore on the island. Although he endured terrible privations and nearly starved to death, he did not lose faith. After being rescued he made a second attempt. This was also unsuccessful and he had to build a boat with which to escape to Panama 300 miles away. Still persevering, Gissler persuaded the government of Costa Rica to grant him some funds and a title to one half of the island. Then with his wife he settled down to planting palm trees and vegetables. He even built several houses for himself. There he remained for twenty long years, alternately cultivating his land and searching for treasure, but never with success. Finally he too had to give it up, but to this day the treasure hunters continue to come to the island.

On the day after our arrival we went by launch from Chatham Bay to Wreck Bay, three miles away. Again we had our escort of sportive porpoises, and even more of the boobies inspected us from close range. Of the latter we found that the brown-footed species were by far the most common but we also saw a few of the green and blue-footed varieties. They all nest on the inaccessible rocky islets which dot the coast or in the tree tops along shore. They are so tame that it is a pity to shoot them even for specimens. The frigate birds were scarcer than at Panama and we saw no pelicans at all.

Wreck Bay is appropriately named. The landing place is a sandy beach about half a mile in length which lies at the foot of a great ravine. It is poorly protected from the heavy swell by an out-jutting headland which rises perpendicularly from the ocean. For half a mile off the beach the water is shallow and the bottom covered with dangerous coral reefs. The battered remains of a fine ship obstruct what passage way there is. Made wise by the mistakes of others we anchored our small launch a long way out from the shore and rowed in with the skiff. None the less we had difficulty in negotiating the rollers and several of these came aboard, wetting our equipment and seriously damaging the lens on one of the motion picture cameras. In the end we had to all jump out and guide the boat in order to get ashore at all.

The beach was fringed with beautiful cocoanut palms, planted by Captain Gissler and under them sagged the remains of two little corrugated iron houses which had once been his home. Now, rusty and battered by the surf and by the falling trees, they serve as ugly reminders of the greed and sordidness which seem to have tainted all human activities on this golden island. We preferred to turn our backs to these shacks, but we were not averse to draining a few of the cocoanuts with which Captain Gissler had unwittingly provided us.

Dr. Herre had seen some brilliant red fish outside the rollers and Cornelius and two sailors and I set out in the skiff with him to attempt to capture some. We struggled

Frank Wonder and Walt Weber at Work in the Laboratory on the *Illyria*

through the breakers and rowed off to the north in pursuit of these dots of color but they were much harder to catch than we had supposed and before long we had travelled more than a mile along the coast and out of sight of our companions.

We found ourselves at the base of a tremendous rock wall which rose straight away from the water and in places overhung it. There was no beach at all except for a stony shelf a few hundred yards long where a brook had worn away the cliffs. On this ledge a heavy surf was breaking. However, Cornelius caught sight of a magnificent waterfall on the face of the cliff back of the ledge and voiced his intention of going ashore to inspect it. The sailors were of the opinion that it would be impossible to make a landing but they backed the skiff in toward the shore so that we could see what the chances were. We found that the surf dashed itself against the rocks with such force that it would be foolhardy to try to land. We were drawing away when Dr. Herre gave a warning shout. The boat had drifted in too close to the shore and a huge breaker, larger than any of the rest, was bearing down upon us. The sailors lost their heads and let the boat turn sideways to the waves. It appeared that we would be dashed to bits, for we were now so close to the shore that an outjutting rock was less than a foot from our stern.

Cornelius gave one look at the oncoming wave and jumped toward the rock. He missed his footing and fell into the ocean. At the same time I jumped overboard. A fraction of a second later the wave broke just under the bow of the skiff and hurled it and us in a welter of foam onto the boulders. Cornelius and I grabbed at whatever rocky outcrop we could reach.

The boat driven virtually backward struck the rock squarely with its stern and had it not been soundly constructed would have been stove in. The oarsmen rowed madly, however, and as the wave receded they managed to get out to sea again, leaving us high but not dry on the shore.

"Go on with the fishing," we shouted to them. "Come back for us when the surf has gone down."

This left time on our hands for exploration, so we proceeded to examine the little valley which led to the waterfall. About three hundred yards from the water's edge the ravine narrowed to a width of only 30 feet and we found our passage blocked by a vertical rock wall about twenty feet in height over which the brook spilled into a little pool about a fathom deep in the center. Behind this wall was the big cliff over which we could see the main waterfall streaming straight down some two hundred feet. We surmised that there must be a larger pool at its base on the level above our heads.

After we had taken off our clothes and had a bath in the little pool Cornelius tried to climb up the slippery wall to the upper level but could gain no foothold. With my pocket knife I cut a pole some fifteen feet in length and we laid it against the rock wall with its base in the little pool. Cornelius climbed up onto my shoulders and grasped the top of the pole. Then I lifted the lower end until his head was above the upper level. There he saw a good hand-hold offered by a crack in the solid ledge and letting go of the pole, grasped the rock.

"Good God," he gasped, "the whole ledge is coming away!"

I dodged a great mass of falling rock but Mr. C. Crane, descending at a rapid rate in accordance with the laws of gravity, struck me on the shoulder with his foot. This was lucky for him for it turned him about so that he landed flat in the pool. Though the water was only twelve inches deep at that point, it served to break his fall, though it knocked out his wind. He had managed a fall of twenty feet into a rocky pool with no more injury than several bruises!

As it may be imagined, after this narrow squeak we gave up exploring and tried to get back to the boat, but on regaining the beach we found to our consternation that the waves, far from decreasing, were much larger than before. The boat could be seen outside the breakers some two hundred feet from shore but it was obviously impossible to bring it any closer. Since we could not leave the shore at either end because of the overhanging cliffs, or climb up the valley back of it we decided our only means of escape was to swim.

Cornelius took off his eighteen inch hunting boots and tied them loosely about his neck. Then we signalled the boat to come as near as possible to the outermost rocky point that we could find. Seizing a moment when there appeared to be a lull we made our way, waist deep, through the water, skirting an unsurmountable rock which blocked our way until we gained this point. But before we could secure a foothold there a huge roller seized us both and dashed us toward the shore. We lost all control of our movements and for several minutes we rolled out to sea with each backwash and then came charging onto the rocks again with each oncoming wave. Finally I regained my feet and managed to pull Cornelius out of the water by the seat of his trousers. His lungs were full of water and his hunting boots were gone, but luckily he had not been seriously injured by his buffeting on the rocks.

Back we went and sat down to think things over. Not daring to try the rocky point again we finally decided to make another attempt to swim out at the place where we had landed. We ran along the shore to this spot and signalled to the boat to come as close as possible. We waded in up to our waists but an oncoming breaker rolled us over and over. Again we had to fight our way to shore. The situation began to look serious for one bump on the head against any of the jagged rocks which lay just submerged beneath the breakers would have been sufficient to end the activities of either of us.

Then an inspiration came to one of the sailors. He had found a long rope, and after tying one end of it to a spare oar and the other to the boat he threw the oar toward us.

"Catch hold of that," he yelled, above the roar of the surf.

After a little while it drifted in close to the shore but not quite close enough for us to reach it. We quickly made a plan—Cornelius would plunge to grab the oar and if he should miss it, I was to jump in and pull him out. Accordingly we waited our time and as the oar was brought in on the face of an incoming breaker, Cornelius allowed himself to be borne out by the backwash to meet it. In the grasp of the strong undertow, he soon lost all control of his movements, but luckily he was carried toward his goal. Just as he disappeared in the curl of the breaker I saw his hand close over the oar. The sailors rowed desperately out to sea. The line grew taut and they pulled it in hand over hand. Although Cornelius had been lost to sight for nearly a minute he was still clinging to the oar when it was hauled from the water.

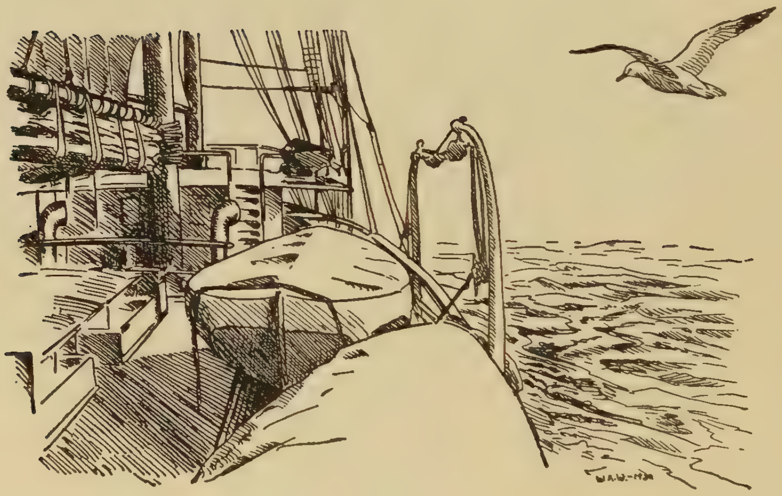
My turn came next, but I was not to get off so easily. When the friendly oar had drifted close in I took my stand,

The High Waterfall at Wreck Bay, Cocos Island which Cornelius and the Author Tried to Approach

in water three feet deep, behind a large rock, thinking that from this vantage point I could dart out and seize the oar as a large roller rushed it toward me. But before it reached my rock I was horrified to find that the undertow from the preceding wave was dragging me forward. In spite of every effort to hold back I was sucked out to sea and found myself ten feet in front of my vantage point instead of behind it. Then the roller, towering high above my head crashed down.

The water roared in my ears as I was borne violently shoreward under tons of swirling foam. Fortunately my mind was still functioning, and knowing that propelled by an irresistible force I would soon encounter an immovable body, I put out my hands in the direction I thought to be in front of me and waited. It was the same sensation I had once experienced when thrown ahead of an overturning automobile. I waited for it to crush me. After an interminable instant, my hands touched the rock. I pushed downward with all my strength, and by a miracle of good luck succeeded in leapfrogging over it without even slackening my forward speed. Once on the other side the rest was relatively easy and I soon found myself gasping on shore more frightened than injured. A second more careful attempt to reach the oar was successful and I was soon hauled aboard the skiff. As we rowed back to Wreck Bay we concluded that pirates were not the only ones who had met with disaster on Cocos.

That evening we took stock of the day's adventures and misadventures. Not only was everyone tired but, they were in addition irritated by the bites of insects and the stings of nettles. Cornelius had suffered several bad bruises and had lost his boots. Frank Wonder's camera and one moving picture camera had been ruined by the surf. One of the small boats had been damaged on the rocks. My new binoculars were full of salt water and so was Walt Weber's wrist watch. Three shotguns had suffered immersion in the ocean. Altogether it seemed that the equipment and personnel of the expedition would not last long at such a rate and for this and other reasons we decided to make an immediate start for the Galápagos rather than to risk another day's stay, even though it were a treasure island.



CHAPTER V

BARREN GALAPAGOS

A CROSS-SECTION from my diary gives a more complete and more vivid picture of our activities in the Galápagos islands than could any orderly account of events which had no order except in time. It transcribes the small unrelated incidents which make up life from day to day on a scientific expedition.

Jan. 3, 1929. En route from Cocos to Galápagos.

I spent the whole day today developing still pictures. The first roll was ruined by a sailor who opened the skylight of the dark room just as I uncovered the film. The next sixteen rolls came out O. K. It was by then four o'clock and I was pretty tired of working, but the German cook, Rudi, came sneaking in and showed me three rolls that he wanted done. Pretty soon the whole crew will have me doing their photographic work!

Had a big game of poker this evening and Dr. Moss cleaned everybody out.

We are heading for South Seymour Island in the Galápagos and the wind is dead against us.

Jan. 4.

Dr. Moss examined Cornelius last night and found him so covered with bumps and bruises from the surf adventure that it was decided to go first to Tagus cove to give him a chance to recuperate before he tries to climb Indefatigable, or "Inexcusable," as Murry calls it.

In the meantime we are bucking a head wind and heavy sea. With motor wide open we are making only 5½ knots and at this rate we can't reach Tagus cove till Sunday.

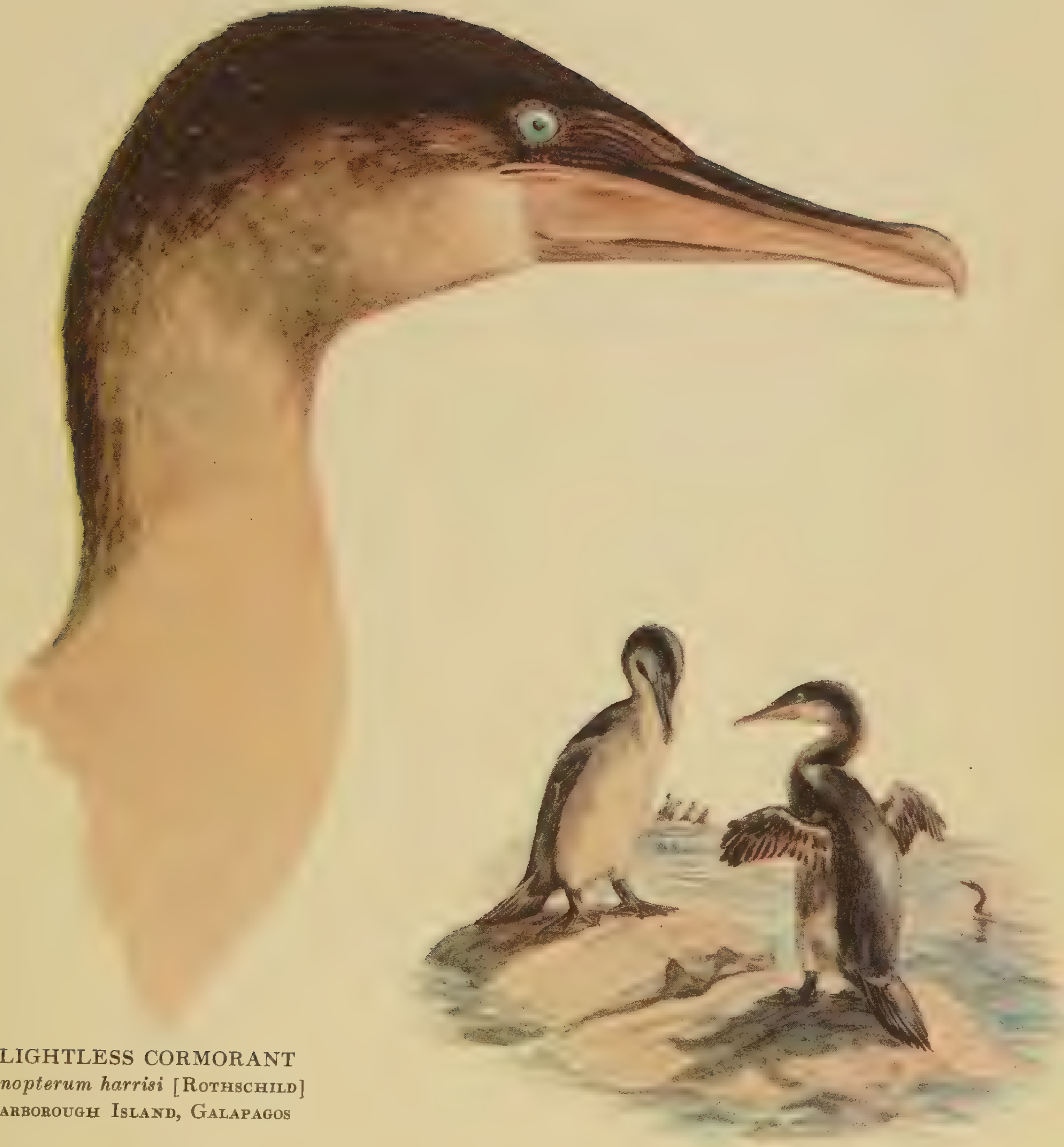
Since I developed his pictures the cook has become very fond of me and maybe I don't get service! Today he climbed up into the rigging with a plate in one hand to give me a special piece of cake. When I get hungry I'll develop some more pictures for him.

The weather is cool, although we are about to cross the equator. Schmidty says that the cold Humboldt current which flows from the Antarctic regions northward along the coast of South America to the Galápagos is the reason for the low temperature. The Galápagos are right on the equator and yet only semi-tropical in climate.

Jan. 5.

We made better time today and this evening are "hove to" about two hours' run from Tagus cove. We have already passed Abingdon and Bindloe islands, both of which rise from the sea to volcanic peaks which were partly hidden by clouds. They are ash gray in color and present to the eye a wide, desolate expanse of recent lava flow without a tree or shrub in sight. No place for a landscape architect!

Had a big poker game tonight which resulted in a win for



FLIGHTLESS CORMORANT
Nanopterum harrisi [Rothschild]
Narborough Island, Galapagos

Cornelius, though Dr. Moss and I were ahead until the last hand. Dr. Herre won't play cards. He is having a big net made which he can hang from the boom while the yacht is travelling full speed. He expects to catch all kinds of rare surface fish and marine life.

Jan. 6.

I am ashamed to say that Murry and I overslept this morning until we were wakened by the anchor chain rattling down in Tagus cove. The others had to wait for us before going ashore.

Tagus cove is much smaller than we thought it would be. The Captain almost sailed right by it. Its shape is bottleneck and the shores rise perpendicularly for fifty feet or more, which makes landing very difficult. On each side of the cove are brown hills about nine hundred feet high and at the far end the northern peaks of Albemarle slope back and up into the clouds.

No vegetation or animal life of any kind is visible from our anchorage—no beaches—no queer animals—nothing but steep volcanic cliffs and reddish brown hills and mountains. Across the strait the rounded dome of Narborough, which sweeps with one majestic curve from sea to clouds, is also gray and barren. Yet the landscape is on such a grand scale, so fundamental in line and texture, that instead of being monotonous it is strangely stirring.

About nine-thirty we all got into the launch and, towing a small boat, went about half a mile to the head of the cove. There we found a dried up watercourse which cuts through the perpendicular wall of the cove at an angle of 45° offering a landing place rather insecure but better than none. As we were clambering from the boat onto the steep shore Chuck gave a shout of alarm.

"Look out!" he yelled, "a big piece of lava is rolling down on us."

We looked up the little valley and saw at the top a big sea lion, which did indeed resemble a piece of lava at that distance. He snorted loudly as he saw us and, turning around, flounced back up the gully. We pursued and soon surrounded him and three other sea-lions who apparently had been sunning themselves on the lava. They retreated to a position under an overhanging ledge, but did not seem very much afraid and allowed us to approach within two or three feet without trying to escape. Their gray brown color is almost the same as that of the lava. We took several pictures and then stampeded them down the gully into the water for the movie camera, but as usual I ran out of film in the middle of the scene.

There is plenty of animal and insect life on the shore. Small lizards with bright red heads scuttled between our feet and we saw Galápagos finches and mocking-birds which are very tame. On closer examination we did find some vegetation. There are several kinds of leafless shrubs with light gray bark and very thick branches, some withered grasses and some flourishing cactus.

Further up the ravine a large bright-colored grasshopper flew into Murry's face and nearly put out his eye. But he risked himself again about five minutes later by picking up a dangerous stinging scorpion, which he thought was a spider, to give to Schmidty.

In spite of our jeers Schmidty had brought along a big

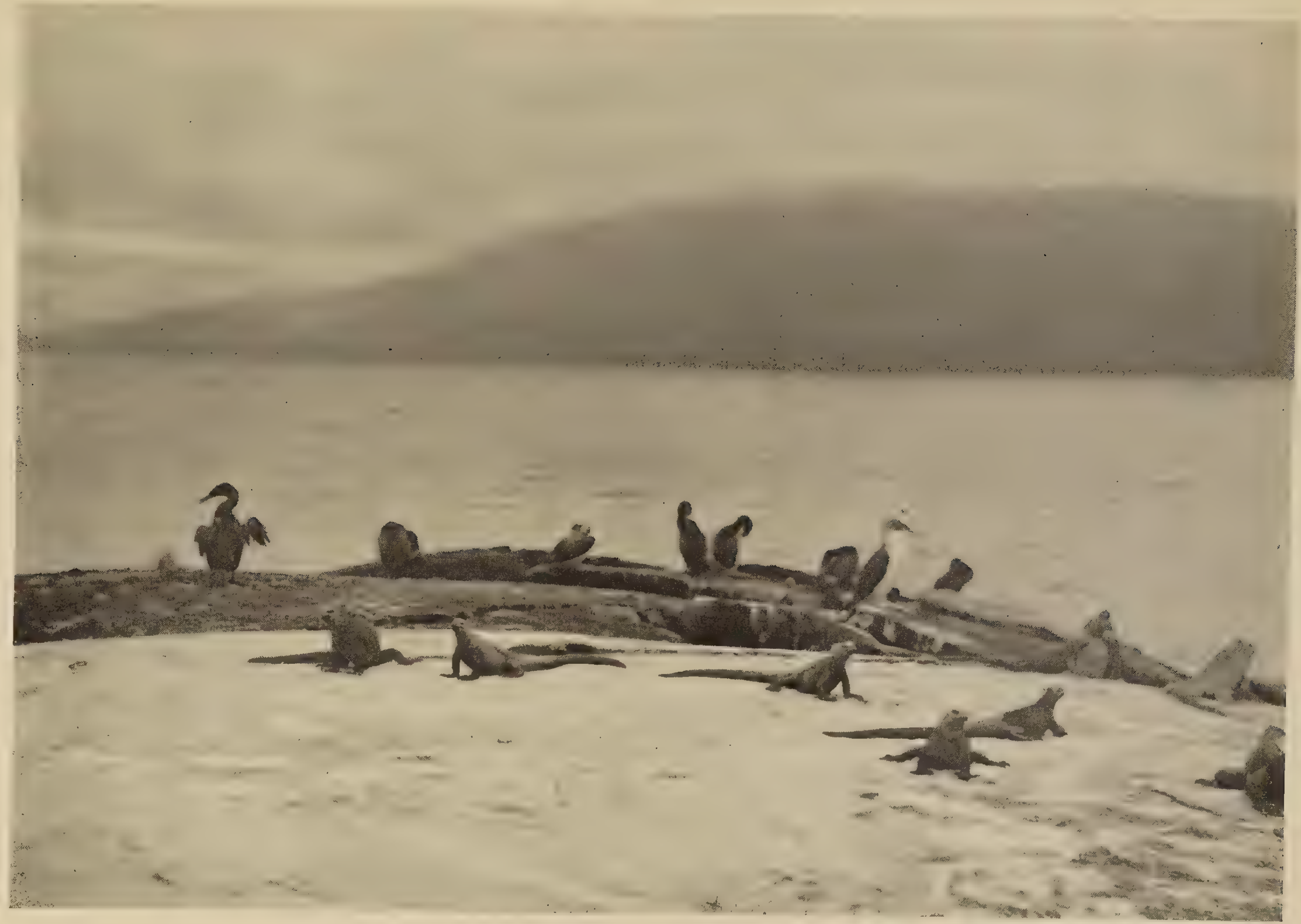


Photo by K. P. Schmidt

SHORE LIFE ON NARBOROUGH: FLIGHTLESS CORMORANTS, MARINE IGUANAS AND BOOBIES

black umbrella which he had carried defiantly under his arm though there was not the remotest chance of rain. We soon found his reason for bringing it. He placed it upside down under a bush and then wacked the bush with a stick until a lot of spiders and beetles fell in. These he picked up with tweezers and put one by one into a jar of alcohol, solemnly watching their dying convulsions. I wish I had taken a movie of his expression.

Leaving the scientists to their antics, Cornelius, Chuck and I went back to the boat and rowed out to the strait and south along the outer shore for nearly a mile. We saw several marine iguanas sunning themselves on the rocks just out of reach of the surf. The shore was as steep as before, but in places there were ledges and caves just above water level and these were alive with the strange looking lizards. We finally found a gully in which to land, but got ashore only with the greatest difficulty.

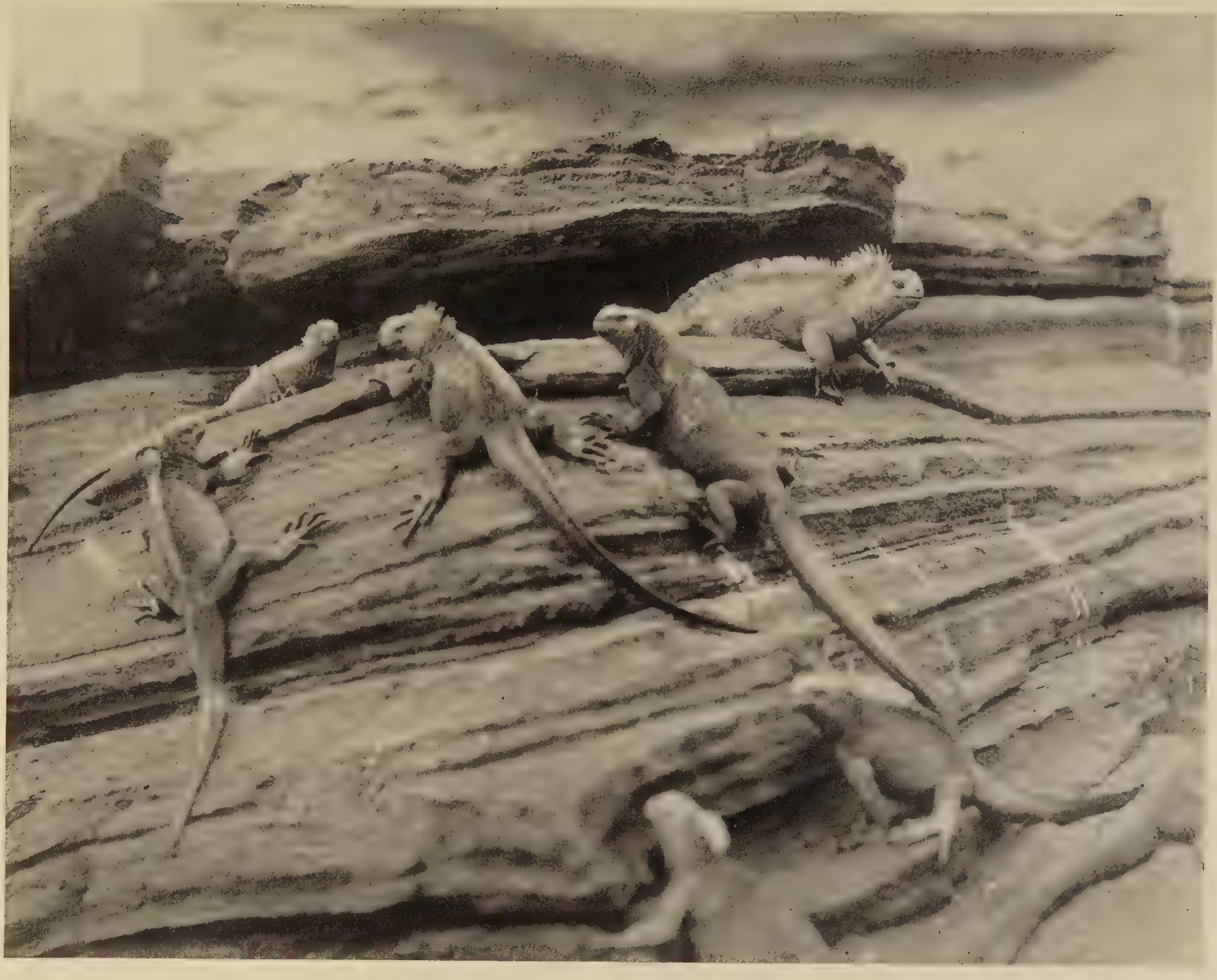
There were no iguanas just where we landed, so we mounted the cliff and followed it until we got back of the steep gully region and were opposite a ledge we had seen from the boat. Then coming toward the ocean we arrived at the ledge. This may sound easy, but believe me, it was some job! The soil consists of rough lava blocks, dust and dry sand which make very loose but very rough footing. There is a steep gully about fifty or sixty feet deep every hundred yards along the shore and in this mess grows cactus and everything that pricks. The whole land surface resembles a plowed field magnified one hundred times and as hot as—well, very hot. Our feet were protected by 18 inch hunting boots, but it took us nearly half an hour to reach a point on the shore only 300 feet from where we had started.

The effort was well repaid, however, for we came upon at least 200 iguanas sitting on the rocks and sunning themselves. These strange anti-diluvian creatures fit into the extraordinary landscape as if created solely for it. They have the same splotched black and gray coloration as the lava on which they bask and their shape is much like that of some of the ripples left in the lava when it cooled. They are well adapted to life along the shore, for their long powerful toes are equipped with recurved claws which allow them to maintain such a strong grip on the lava that even a heavy wave cannot pry them loose.

They vary in length from three to four feet when full grown and their outer skin consists of hard scales which are dull red and green after the skin has been freshly changed but lose their color after a short time. The crest of spines down the middle of the back and the sharp conical scales on the upper surface of the short head contribute to their queer appearance.

Schmidty says that their habits are as strange as their appearance. They feed entirely on seaweed which grows just above the low tide mark in such abundance that the day's food is secured in a short time. In the water they can swim well by sidewise undulation of their tails, but on the land their gait is awkward; the body moves from side to side at every step.

We found them to be very tame indeed, perhaps because they have no natural enemies on land, and we were able to approach to within two or three feet of them before they would bother to crawl away. When we did not disturb them too violently they contented themselves with nodding their heads at us very vigorously and blowing little bubbles from between



Marine Iguanas at Tagus Cove

their sharp teeth and goat-like lips. I tried to chase one into the water, but he was very loath to leave the shore. Finally, I caught him by the tail and threw him in. He swam along the shore a short distance and then came out again and ran up one of the small ravines.

The only other living things we saw from this particular spot on the shore were many crabs, a few gulls and two or three flightless cormorants preening their plumage.

After a while the boat came for us and we picked up the others and returned to the *Illyria* for lunch.

Dr. Herre had set off some dynamite while we were gone, but secured only six small fish. Humorously enough, during the same period of time the crew of the *Illyria* had caught six large sharks, dozens of groupers and a rooster fish. The groupers have a very queer shape and remarkably bright colors.

A short while after lunch we started out again and went to a beach about two miles along the shore in the other direction. Here we had no trouble in landing on the soft, coarse sand and took the Akeley camera ashore. We caught an iguana by the tail and putting the twelve inch telephoto lens on the camera, tried to get a panorama close-up of the animal running, but he started off so fast that the camera could not keep up with him. We had to catch him and let him go again three times before I finally succeeded in getting the picture.

On the beach were many sea-turtle tracks and holes in the sand where it seemed the turtles must have laid their eggs, though we could not find any. We are going back tomorrow to look for turtles. To make such tremendous tracks they must be very large.

We took a long walk up the beach and saw many more iguanas, several sea-lions and a very tame hawk which Dr. Moss shot for a specimen. Then we returned to the *Illyria* and are now discussing what we shall do tomorrow. I hope that tomorrow will be as good sport as today. We still have the diving to try.

Monday, Jan. 7.

After I finished writing last night Dr. Herre tried a fishing experiment. He lowered to the surface of the water a bright light which attracted a great number of mackerel. They were so numerous that the water appeared to be alive and squirming. We managed to catch forty or fifty with harpoons, nets, baited hooks and we even got one on a bare hook. Then a shark came near and all the fish disappeared as if by magic.

What with all this fishing, etc., we did not get to bed until very late and so were up late this morning. At nine-fifteen we all piled into the launch and went back to the beach, where we saw the turtle tracks yesterday. We made a long search for turtles and eggs, but were completely unsuccessful.

Then the rest of the party unrolled a tremendous seine about 250 feet long and hauled it around in a semi-circle near the beach. It took them about half an hour of good hard work to get the seine around the semi-circle and to haul it up onto the shore, but all they caught were three small puffers which, no matter how much they inflated themselves, could not seem a very large catch to Dr. Herre.

Afterward I walked southward along the beach, climbing over inconceivably rough and twisted lava flows which had streamed out like arms from the main mass of rock during some recent eruption. Finally I came to a small sheltered beach upon which were the tracks of a large sea-lion. I looked around in vain for signs of him, until suddenly I saw what looked like a dead sea-lion, being battered about in the surf. However, when I approached it came to life and swam away.

A little further along I came upon another large male rolling in the surf in the same way. He would allow each inrushing wave to carry him up the beach in a swirl of foam and then when the water receded he would roll down into the next oncoming breaker like a sack of cement. This sea-lion must have been asleep, for his eyes were closed and although I approached within ten feet to take pictures he took no notice of me for over a minute. Then he seemed to awake with a sudden start, snorted loudly, glared at me and dashed away.

The rest of the party in the meantime, had gone out to spear a turtle which had swum by, but missed it because the sailor George, who was running the launch, shut off the power at the wrong moment. George does everything at the wrong moment and in fact shows no signs of being able to handle a boat and very little desire to learn. He bangs the launch into the *Illyria* every time he gets near her and is continually nearly upsetting the tow-boat.

At lunch we sampled roasted iguana, which had been prepared only with great difficulty. The meat did not look very appetizing, but aside from being stringy, had a pleasant rabbit-like taste, probably resulting from the seaweed diet of the original owner.

After lunch we started off across the strait to Narborough, about four miles away. Our purpose in going was to take Schmidty and Frank Wonder to a certain lava flow about thirty years old, where they expect to trap rats. It seems that rats are about the only mammals on the Galápagos and there are very few of these. Schmidty plans to set out his traps and to camp out all night on the lava to see if he can get a new or rare species.

On the way across the strait we saw some giant rays—large triangular fish nearly five feet across—jump clear of the water and several feet into the air, turning a complete somersault before they fell back with a tremendous splash. We came quite near to one of these devil-fish, as they are generally called, and spent some time trying to harpoon it, but because of one thing and another—mainly because of George, who was still running the launch—we did not get one. The rays are easily distinguished because their two fins show above the surface of the water and flap like the wings of some ungainly bird. These two fins are as far apart as the ray is big—anywhere from five to twenty feet across.

Dr. Herre had been sitting in the tow boat, trolling, all the way across the strait for game fish. During the excitement of chasing the ray we had forgotten him, but a little later a warning shout from his direction reached us over the noise of the motor. We looked around and saw poor Dr. Herre letting out line at a tremendous rate. His foot got caught in a snarl and if we hadn't slowed down just in time I think he would have been pulled out of the boat. He played his fish for a long time and finally brought it aboard. It was a large albacore—a fast gamy fish with bright coloration, which looks like a first rate over-the-mantelpiece decoration.

We approached the shore of Narborough at a point on which Schmidty had gathered from previous accounts he could

Jimmy, the Penguin

catch the rats, but found that a recent volcanic eruption had covered all the land surface with fresh lava, leaving it absolutely desolate and nearly impassable. We continued southeast along the shore for several miles to a point where some mangrove trees had grown since the eruption. The terrain looked very uninviting, but Schmidty decided it would have to do and we went ashore in the rowboat.

On the shore were so many iguanas that in places they were lying criss-cross over each other. All around us we saw pelicans, terns, flightless cormorants and sea-lions. Turtles swam by and occasionally protruded their heads.

The work of setting up camp was at once under way. Dr. Herre exploded a charge of dynamite in a tide pool in the hope of getting some new specimens. Schmidty made an improvised flagpole and hoisted the Explorers' Club flag, of which he is very proud, and Frank Wonder constructed a fireplace of lava blocks. Walt Weber shot some bird specimens and was soon busy with the task of preparing their skins.

Seeing the scientists thus happy at their work, the rest of us made ready to leave, but as we approached the shore a small sea-lion struggled out of a hole in the lava and started galumping off toward the water. I made a dash and caught it by one hind flipper. It seemed pretty tame, so we have christened it Mabel and brought it back to the *Illyria* with us. We left Schmidty, Weber and Wonder alone in the dark with the iguanas and the sea-lions.

We have just been trying some experiments with Mabel. She likes to listen to the victrola and to sit in a plush armchair. We put her into the sink in the laboratory and turned on the water. When she was only partially submerged she tried to dive, but of course couldn't, so she became very angry and splashed water all over us.

As I write we can see lights flashing six miles away on Narborough, where we left the scientists. The radio operator says the flashes are not in code, but they well might be, for we have found that the campers left all their blankets and cooking utensils on board the *Illyria*—true absent-minded scientists!

Jan. 8. Tuesday—still anchored in Tagus cove.

This morning Cornelius, Chuck, Murry and I commandeered the crew's launch to go turtle hunting and ray fishing. With Mr. Briggs at the helm we cruised back and forth outside Tagus cove for a long time without seeing anything except sharks and flightless cormorants. We were about to give up when we noticed a flock of small gulls over some objects in the water. On approach we found a whole family of rays sporting clumsily on the surface. There were two very large ones whom we named Mr. and Mrs. Ray, and a whole kindergarten of little Rays.

Mr. Briggs steered at full speed for Mrs. Ray and the little Rays ducked to either side. As we neared our goal Cornelius stood up on the bow with the harpoon, but a big wave caused him to lose his balance and at just the wrong moment he collapsed into the bottom of the boat. Mrs. Ray quickly escaped.

Next we headed for Mr. Ray and this time Corny did not fail.

"Give her the gas! Mr. Briggs!" he shouted, as the big fish, larger than the top of a grand piano, came to the surface and an instant later he thrust the harpoon home.

"Look out!" yelled Murry. "Brace yourselves."

Hardly had he spoken than we struck the back of the monster and the whole boat jarred as if we had hit a reef. The ray was now nearly on the surface and I fired three shots into him with the .22 hi-power rifle at point blank range.

Mr. Ray went tearing off with flippers waving wildly above the surface. Presently he had taken all the rope with him, so Murry threw over the five gallon carboy which acts as a float. It bounded along on the surface at a great rate.

We followed after with guns and lances ready, but the wily fish changed his tactics and sounded. To our chagrin the rope and bottle went down with him. We waited over half an hour without seeing any signs of our quarry. Then the bottle and rope appeared on the surface nearly a mile away. The harpoon must have pulled loose.

Shortly after, we harpooned a second ray and went through the same procedure all over again. The bottle was pulled down out of sight and this time never came up again, so we had to return minus our equipment.

We had one casualty. When we picked up the carboy the first time, I reached for it with my hand and Chuck reached with the fish gaff. The sharp point of the gaff went nearly an inch into the palm of my hand and produced copious bleeding. However, it has nearly healed over already.

After an early lunch we set out for Narborough with the scientists' blankets, etc., and even their rat traps which they had forgotten. We found them wet and hungry but happy because a big rat had run over Frank Wonder's face during the night. This was a good omen.

It seems that the lava flow which yesterday we thought to be new is, in fact, about a hundred years old and wild life is abundant. Schmidty and Walt wanted to remain another night, so we left them again. I hope they don't forget their heads.

We also let our friend, Mabel, go, but she took it with perfect calmness and would not even go into the water until we chased her.

Jan. 9. Still at Tagus cove.

We had another and more exciting fishing trip this morning. This time Dr. Moss went with us and we were equipped with a new and better harpoon, two new and larger floats and a lot of extra rope. We also have had a rope rail put around the bow of the launch so Cornelius will be able to brace himself as he throws the harpoon.

We cruised over an hour without seeing much of anything. Then Chuck gave a sudden shout.

"Look over there! Whales!"

We looked and saw eight or nine large blackfish. These are mammals about thirty feet long, a small variety of whale. They were swimming along after the dolphin fashion, with just their dorsal fin and part of the body showing. Every now and then they would spout, leaving geysers of water vapor hanging in the air.

"Hard a port. Full speed ahead," directed Cornelius and soon we bore down upon them. Just before we got within harpooning distance they nosed slowly under and passed directly under the boat. The water boiled all around us and we expected to be struck and overturned at any instant.

They came to the surface far astern, so with renewed courage we attacked once more, but again they eluded us. A sort of game ensued. We would creep warily up on the ambulatory blackfish and they would pretend to be asleep until the last moment. Then, puffing and snorting, they would dive under and break water again some distance away.

Finally we remembered having read somewhere that a whale cannot see straight ahead. Whether or not that may be true, I am not certain but when we approached from the front we got so close I thought we would collide with one head-on.

"Heave ho!" yelled Corny and hurled his harpoon with such accuracy that it hit the imposing monster squarely on its back. The whale dove and went directly under the boat, so close that the harpoon rope became fouled in the propeller.

Of course the harpoon pulled out of the whale at once, and while the victorious blackfish bounded off toward the horizon, Murry had to jump overboard and clear the propeller. Several sharks loitered about while he was in the water, but did not dare approach very close.

When we finally got started again we had lost the harpoon shaft and the game had vanished. I am not very sorry, for if we had fastened onto a blackfish the Lord only knows what we would have done next!

Jan. 10. It has been a dull day today.

We fished all morning without even seeing anything and waited around all afternoon for the scientific gang to be brought home from Narborough.

Then as we weighed anchor the Captain got into a perfect fury with George for disobeying his orders in regard to handling the launch. We were glad to cruise slowly out of Tagus cove and back down the strait whence we had come. As we left, the sun broke through the clouds and lighted up the scarred and seamed mountain-sides with an unearthly light which well fitted Beebe's designation—Galápagos—World's End.

The brightest spot of the day was a little penguin named Jimmy which Frank caught on Narborough and which now runs around the laboratory flapping its flippers and nipping everyone who comes near.

The scientists are very pleased with the results of their stay on Narborough. Schmidty has made some new observations regarding the marine iguanas and the flightless cormorants, Walt has started some fine sketches and Frank Wonder is overjoyed at having trapped a rare species of rat.

Schmidty's observations are, in part, as follows:

"The large group of marine iguanas on the ledge adjoining our camp afforded excellent opportunity to watch their behavior. A deep crack in the lava provided a place of refuge to which, with the exception of two or three old males, they retired for the night. After feeding in the morning, they took up their positions for the day, a dozen or more old males scattered about, with an interval of several feet between any two, while the females, and the young males, piled together in a compact group to the number of fifty or more, sometimes one on top of another. A curious promiscuous polygamy evidently prevails among them, the group of females forming a harem for the old males. The latter fight for their sunning places whenever another of their sex approaches. Their mode of fighting is amusing in the extreme, for they butt like a pair of billy goats, each meneuvering to get his horn-covered head under the adversary's chin. Such fights often continue until the lips of the combatants are quite bloody, and a bloody spray replaces the jet of vapor puffed from their nostrils. The longest encounter recorded lasted four minutes. Fighting between the males may be confined to the breeding season, which was in full swing at the time of our visit. The curious nodding of the head, which is only slightly modified from the ordinary bobbing of most iguanid lizards, is frequently a part of the courtship behavior. I did not see them bite at each other."

Jan. 11.

Woke up this morning to find us well out to sea and skirting distant blue and mountainous islands. About lunch time we reached Academy Bay, where we have come in order to climb Indefatigable, and anchored half a mile off shore. We had been told of the existence of a fresh water lake on the summit of this mountain and were anxious to verify the report.

On the shore we saw a half dozen small wooden houses, and a stone pier. This was queer because there are not supposed to be any houses at Academy Bay. We went ashore at once to see if we could discover the reason.

As we neared the stone pier we saw standing on it two very ragged looking men with large straw hats. They motioned us to avoid certain dangerous rocks in the lagoon and then as we drew nearer they swept off their hats with a sweeping flourish and said, "Buenos! Buenos!"

When we got ashore they continued to bow and smile and say "Buenos! Buenos!" but no matter how many languages we tried on them, we could get no results.

Suddenly "Dutch" Hollander, one of the sailors who had come ashore with us, broke into a brilliant smile and began talking to them at a great rate of speed (in Norwegian, as we later found).

"They're Norwegians," he explained to us. "They were sent out here two years ago by a South American fishing company to engage in fishing and canning the fish. That big building over there with all the rusty machinery is the canning factory."

"Only two men?" asked Cornelius. "How can two men run a factory?"

"Oh! There were thirty-five of them at first, but some died and all but eight of the remainder went back last year when the fishing company failed. Those who stayed here are trying to start a fruit plantation."

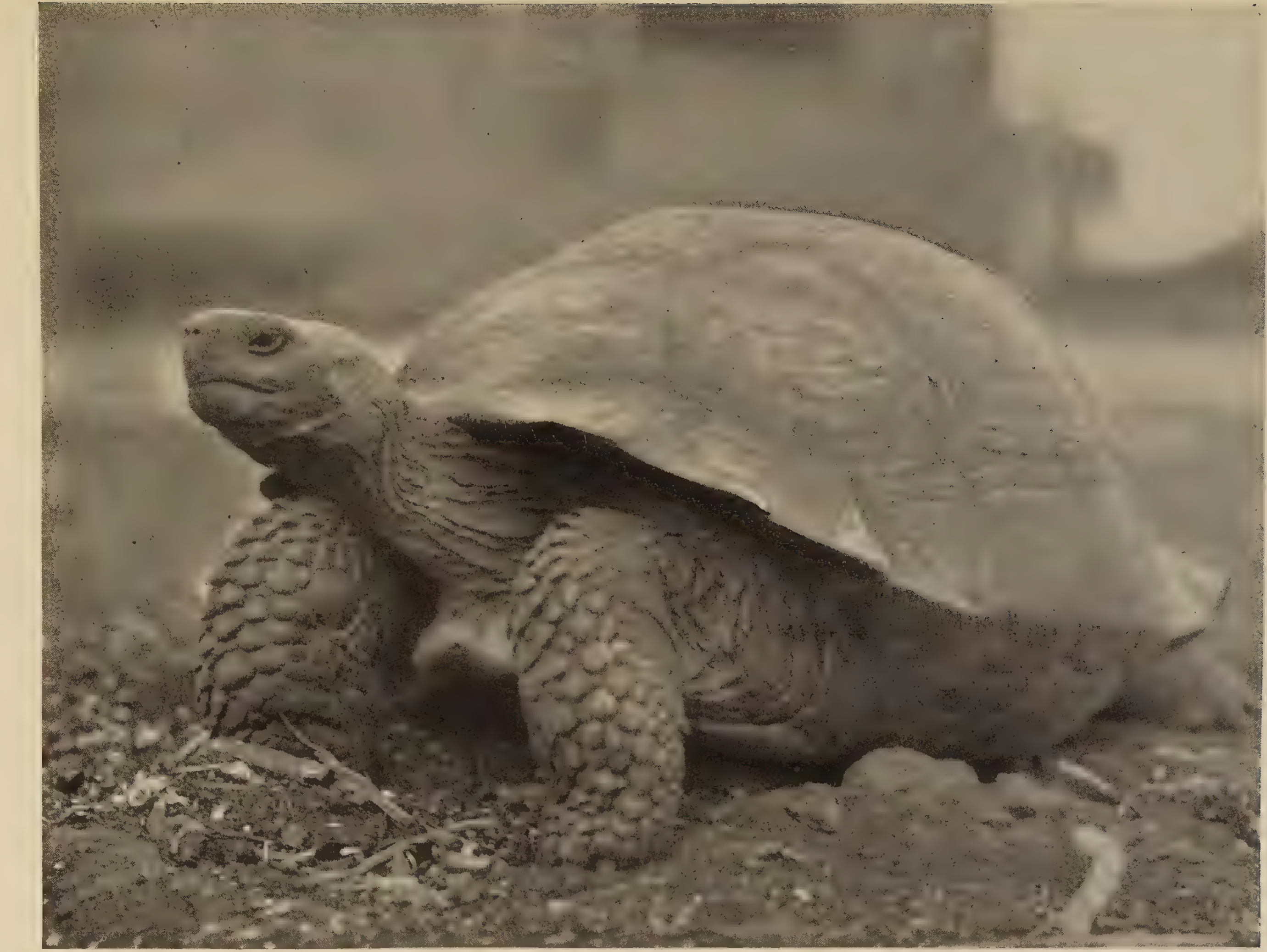
"Well, where are the other six?"

The Norwegians led us around the factory and past four tumble down little houses to a clearing in the cactus thicket where stood three rude wooden crosses. They talked slowly to Hollander but their gaze never left the crosses.

"Two were drowned in the surf last October," he translated. "The bodies were washed ashore the next day. The other was burned to death only a few weeks ago. He got himself covered with kerosene while in the canning factory and then a spark set him afire.

"We are the first people who have heard of their deaths for no boat has been here for over six months. The other three are alive and are working a plantation about six miles from here on the side of Indefatigable. We can go to see them tomorrow if we want to."

Near the cemetery Schmidty found a great tortoise shell, bleached and rotting. The Norwegians noticed his interest in it and motioned to us to follow them to the canning factory. There we found what we never expected to have the luck to see in the Galápagos! Two live giant tortoises—each better than three feet long!



The Giant Tortoise of Indefatigable

Measuring nearly three feet from head to tail

"Hooray!" shouted Schmidty. "The expedition is a success. Let's look at them. Bring them out into the light!"

The tortoises weigh about fifty pounds each. They have large armored feet, padded like those of an elephant, triangular heads, short tails and beady eyes which blink solemnly. Their motions are most deliberate but when one starts to move he goes along very steadily, pushing aside all small obstacles. They can pull in their heads for protection or stick them out eight or nine inches for observation purposes.

Schmidt plans to buy the tortoises from the Norwegians and ship them home alive from Tahiti. He thinks they would live in a North American climate and says they are already about twenty-two years old.

He says that this tortoise (*Testudo porteri*) has survived the savage raids of the crews from the early whaling and exploring vessels (who killed more than 13,000 tortoises in thirty years) only because the lava and cactus growth on Indefatigable make the mountain-side so impenetrable that a small number of the reptiles escaped. The whalers wanted them for fresh meat, especially since a tortoise will live on shipboard for several months without having to be fed.

We have made friends with the Norwegians by giving them several cartons of cigarettes. Tomorrow they are going to lead us to the "hacienda" on the rain slope of the mountain where their friends have started a plantation.

Jan. 12.

We got up at 5:15 this morning and went ashore in a drizzling rain—all except Dr. Moss who did not feel well. We were met at the pier by our two Norwegians who soon loaded our blankets and supplies for three meals onto two little donkeys, for we planned to be gone all night and ascend to the top of the mountain. Then we started off along a narrow trail in the underbrush.

The country was at first dry and rocky and covered with cactus plants. There was one remarkable variety which had a trunk about 10 inches thick and a height of thirty feet, with "leaves" at the top only.

After a mile or more we came to a steep cliff about fifty feet high and after we had ascended it we found no more cacti but in its place fairly luxuriant green vegetation. The vines and underbrush were so thick that if the trail had not been cut out previously to some extent we should have been unable to penetrate it.

As it was we had plenty of trouble, because we could not see the ground beneath us and kept stumbling on the sharp volcanic fragments. Dr. Herre fell and cut his leg badly.

We proceeded at a slow and painful rate through this monotonous jungle for three and one-half hours; ascending about 800 feet in elevation.

As we gained elevation the foliage became more and more luxuriant, and the atmosphere more and more humid. Schmidty explains this phenomena (as nearly everything else in the Galápagos) by bringing forward the cold Humboldt current. It seems that the winds become cooled as they pass over the Humboldt stream and pick up less than their normal quota of moisture. When the dry wind reaches the sun-baked islands it is at first heated and absorbs water so that no rain falls. Then as the air current passes upward on the mountains it is recooled and by condensation produces a fog belt and definite humid zone.

One-half of the Population of Indefatigable; the Horneman Family

Finally we saw a large clearing planted with banana and plantain trees. In the middle of the plantation we came upon a miserable little box of a house set on very long legs.

"Hola!" cried our guide and at once a fair-haired blue-eyed Norwegian about thirty-five years old came running out. He swept off his hat and bowed politely but was plainly very astonished. No wonder; we were the first visitors in two years!

Cornelius gave quite a long introductory speech concerning the reason for our being there and then introduced each of us very formally as Mr. Peavy, Mr. Shurcliff, etc. The Norwegian bowed and smiled brilliantly all through the speech but at the end said, simply "No speek Eenglish."

However, he produced some fresh pineapples and papayas and some rusty knives and nicked enamel plates so we all sat down at a table under his house and feasted.

Our guide then motioned us to follow again and we marched half a mile further to another little house on stilts. Here we found Mr. Horneman—a gentleman who lives at the end of the earth.

Horneman appears to be about forty years old though it would be hard to tell because he has an enormous blonde beard and nickel-rimmed eye-glasses which pretty well conceal him. He wears tattered overalls and goes barefoot but he can speak several languages and has the bearing and manner of an educated man.

With him was his young and rather pretty wife and a baby about eight months old. The baby looked at us with very round eyes—for we were the first strangers he had ever seen! The grounds around the house were a terrible mess of hens and chickens, tree stumps and old tin cans, but inside the little dwelling all was clean and neat. There were three rooms, all very small, and when we had gotten inside with the Hornemans there was no room left at all.

On the walls hung many photographs of Norway and especially of Spitzbergen in winter, which seemed a little out of place here on the equator. In a corner was a bookcase filled with Norwegian books (some of them scientific articles on the Galápagos islands) and ornaments of copper and silver.

Horneman explained in broken English that he was trying to start a banana plantation but had not been at it long enough to get results. Some merchants in Ecuador had promised to send him supplies but had failed on the last shipment. He did not seem worried about his position but a chance remark which I made to his wife led me to understand what a strain they must be under.

She had managed to convey to me with fragments of English words the idea that her baby was very pale as a result of living in such a rainy district. Wishing to be polite I said. "Nevertheless, he looks like a very intelligent baby."

Of course she could not understand so I tapped my forehead, pointed at the baby and said, "Bright! very bright!"

Mrs. Horneman gave a great gasp and turned frightfully pale. She directed a startled glance at the baby and said "Not blight! Not blight! Oh, No!"

Plainly her greatest fear was that the baby might be taken sick so far from any doctor. I tried to calm her by saying—"Oh, no! I meant brains! The baby has brains!"

Unfortunately she thought brains was another disease and it took the combined efforts of both Schmidty and Dr. Herre,

Lunching at the End of the World

each speaking eight different languages at once, to reassure her.

We presented Horneman with a whole carton of cigarettes and went outside to eat our lunch. He was too short on food to invite us to eat with him but he and his wife started to make some coffee for us.

Cornelius hauled out a bottle of cognac which had been brought along and was about to pour it into our tin army cups when there came a great cry of "Hola!" and Horneman dashed out with some wine glasses which he must have been treasuring for just some such occasion.

We all drank to the health of his wife and child and then presented him with the rest of the bottle, still half full. He was delighted and again ran into the house and brought out two stools and a board, out of which he made a table. He covered the table with a nearly clean, white linen table-cloth with blue embroidered trimmings.

Then he produced a tray on which were a lot of demitasse coffee cups, white with gold rims and a sugar bowl with some home-refined sugar. His wife brought out the kettle of coffee and he poured us each a cup with the gravest of ceremony and politeness.

"Well!" said I to myself, "here we are at the very end of the world, where no one ever comes and where the only inhabitants are barefoot and dressed in ragged overalls, and have beards down to their waists. One would hardly expect the formality of a blue and white table-cloth and demi-tasse in gold cups!"

It struck all of us as being so delightful that we gave the Hornemans all the rest of our supplies.

These colonists had of course thoroughly explored their island and informed us that there was no water of any description on the peak of Indefatigable. The object of the climb being removed, we unanimously decided against it and returned directly to the yacht.

We agreed on a price for the tortoises or "Galápagos" as the Norwegians called them and carried them out to the yacht where they now have the freedom of the decks, and we have already sailed away, leaving our new friends to their solitary existence.

Jan 13.

Woke up today to find us anchored off South Seymour island which, unlike the other islands of the group, is very low and flat, seeming to have an elevation of nowhere more than thirty feet.

After breakfast we went ashore and succeeded in making a landing on a small beach. Above the beach was a fringe of green cactus trees and behind the fringe a great field of reddish rock fragments dotted with cactus and withered bushes.

"Look sharp, fellers!" said Schmidty. "We ought to see some land iguanas here and don't let them bite you."

Before long we had found several, each sitting in the rather parsimonious shade of a cactus plant or bush. These land iguanas are quite different from the sea variety. They are of a dull red color, matching the rocks on which they live. They are often as much as four feet long and weigh over thirty pounds. However, they are not as dragon-like in appearance as the marine iguanas for the spikes on the back are much smaller and the head is a different shape.

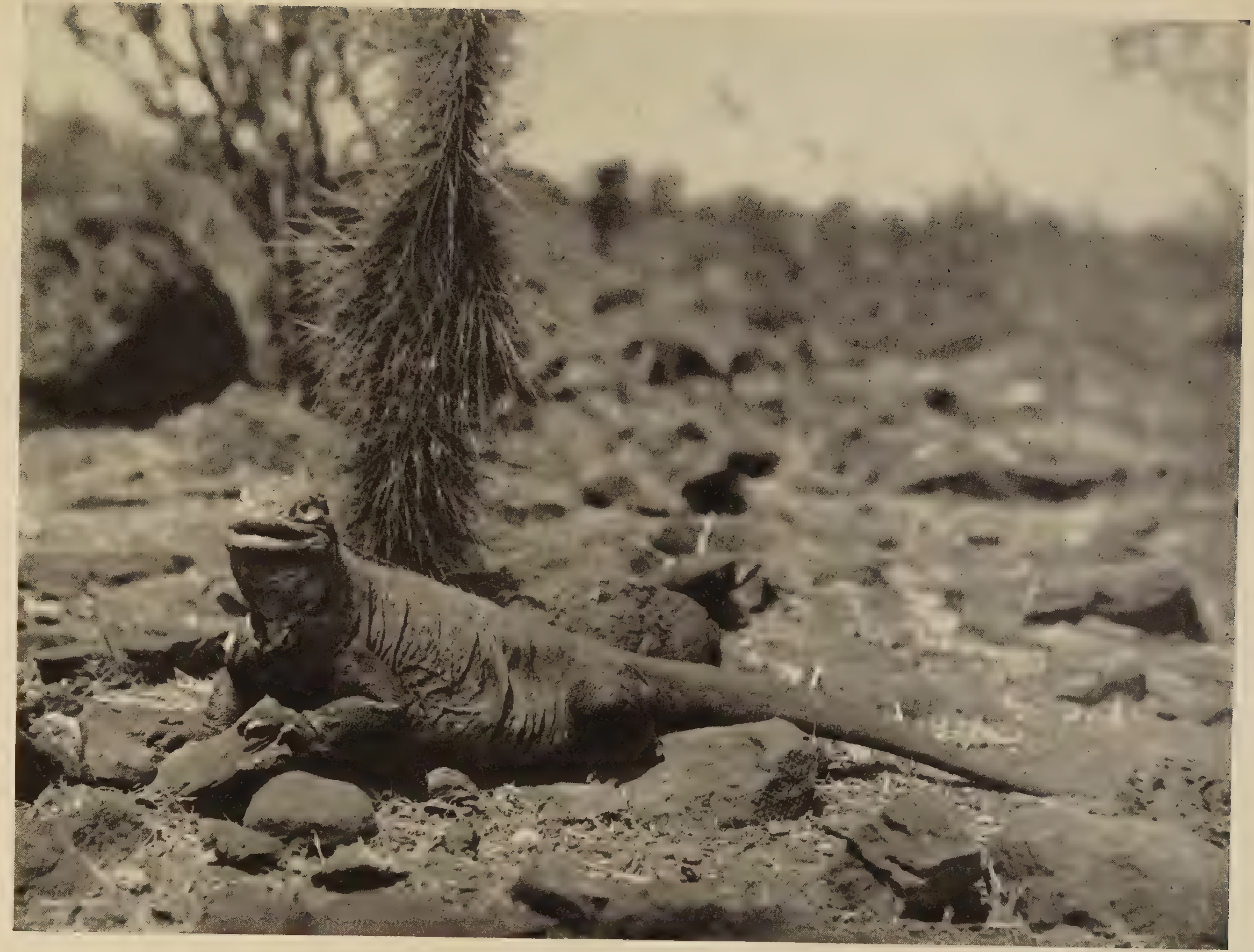


Photo by K. P. Schmidt

A Big Land Iguana on South Seymour

The broken volcanic fragments and the spiny cactus are characteristic

We caught several and photographed them, taking great care not to be bitten for they snapped at us viciously. Walt is going to keep one alive to make a painting of it.

While we were photographing the iguanas Cornelius wandered off with his Springfield rifle and soon we heard several shots. He came running back and asked for help to carry three goats he had killed. I am glad he got them because we need meat badly.

For lunch we had an enormous meal consisting mostly of gifts from the Norwegians—doves, goat's meat, sirloin steak, corn on the cob, potatoes, soup, dessert, etc. I ate so much I went to sleep right after lunch.

Dr. Herre and the engineers, however, had gone ashore on a large beach three miles away and about three o'clock I was awakened by shouts for movies. Going on deck I saw in the skiff two enormous sea turtles, each about 3½ feet long and dull green in color. They had flippers instead of feet and their heads were as large as big cocoanuts. They are much more beautiful than the land tortoises, being built on a streamline design with bullet noses and flippers which must be nearly frictionless in the water. They reminded me of modern armored cars or a new type of battleship—particularly as they were the same color all over and had no projections or bumps on the shells.

After the turtles had been hoisted aboard with a block and tackle we got into the skiff and went to the beach where they had been caught. Here we found Dr. Herre and the engineers, who had just managed to catch three more turtles. The first two had been surprised on the beach but the engineers had bravely captured three in the water, dragging them ashore only with great difficulty. We looked around in the sand for eggs but couldn't find any.

We had brought the diving equipment in the skiff and Murry, Chuck, Cornelius, and I were anxious to try it out though the sun was nearing the horizon. Anchoring the skiff in about 25 feet of water, we fastened a ladder to the stern and weighted the lower end so it would stay down.

Then we connected up the diving helmet with the pump and Cornelius decided to be the first one to try it. He stood on the ladder with just his shoulders out of water while we put the helmet over his head and weighted it with lead. A rope was tied to the helmet and signals were arranged—two jerks for more air—three jerks for emergency danger and four for coming up again.

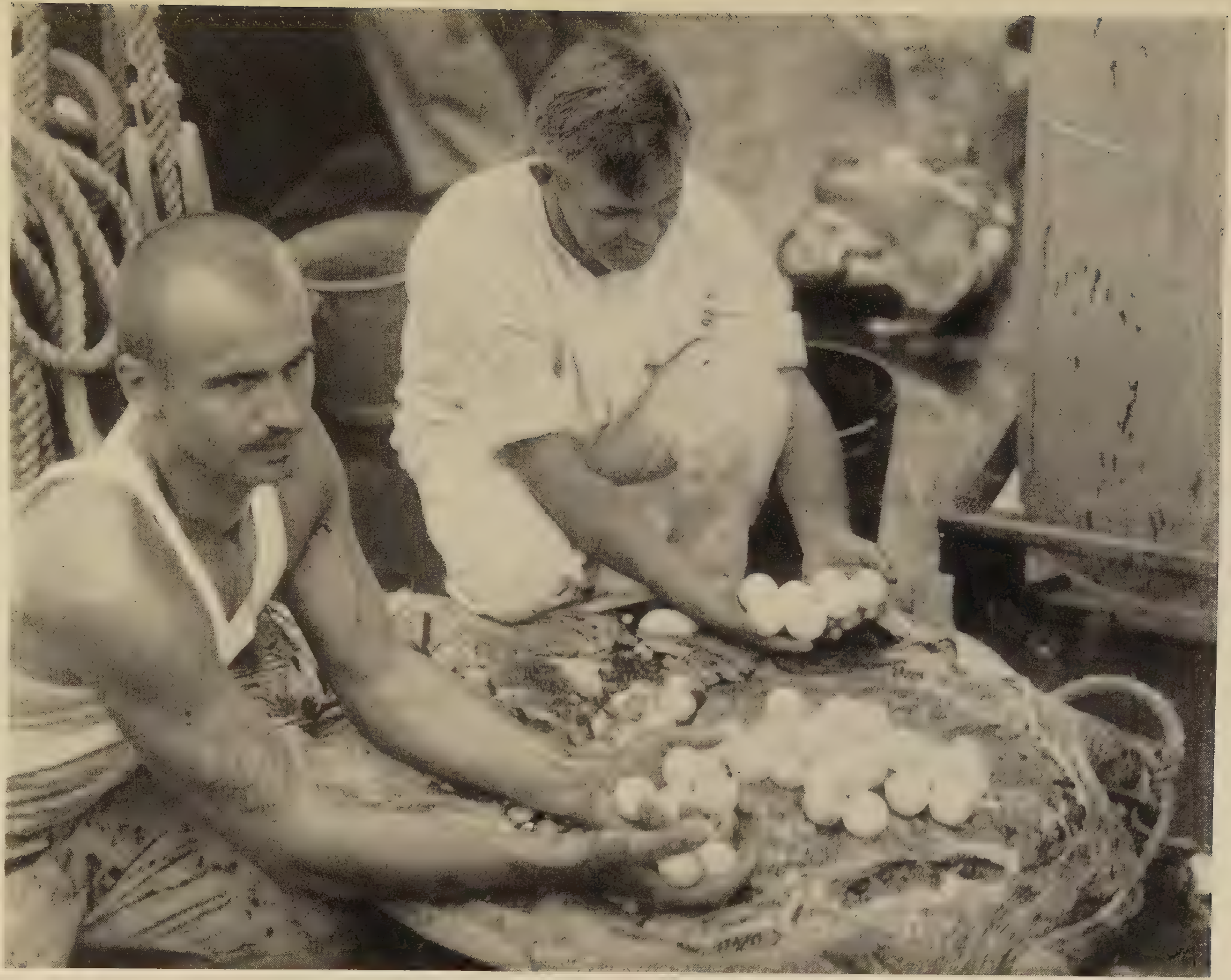
Having arranged everything I manned the air pump and Cornelius disappeared down the ladder amidst a great cloud of bubbles.

Sixty seconds later he shot out of the water about ten feet from the boat, minus the helmet and spitting violently. We hauled him aboard and he explained that when he got to the bottom his ears ached so violently that he threw off the helmet and came to the surface.

We hauled up the helmet by the air hose but found he had left a good spear down on the bottom so Murry volunteered to go down and get it—though it was almost sunset by then.

He adjusted everything to his satisfaction and went down, reaching the bottom after a couple of false starts. He walked away on the bottom until he reached the end of the hose—about fifty feet—and finally came up again with the spear.

He had seen a three foot shark which had swum around



Bert, the German Cook, and Bill Dwyer, the Steward, Extracting Eggs from a Sea Turtle

and around him and had also cut his finger on a little "flower" which he tried to pick.

Chuck tried next and stayed down for over two minutes.

By this time it had become quite dark but I decided I must try, so I stripped off my clothes and climbed part way down the ladder. Murry put the helmet on my head and the air came hissing in wish-swish-wish-swish. I climbed slowly down the ladder and soon experienced considerable pressure on my ears. Swallowing relieved the pain a little.

The air being pumped in and bubbling out at my shoulders made a very loud noise and the water was so dark I could not see anything but the bottom of the ladder several feet above me. It was a most uncanny feeling; particularly as a small shark which kept darting in front of my face made me think of bigger ones and I was quite content to stay down less than a minute and took only a few steps on the bottom. Now I am anxious to try it again.

We had some job getting back to the *Illyria* with eight men, a diving outfit and three 150 pound turtles in the little skiff—especially as the turtles kept thrashing all the time.

Tomorrow we plan to take in some traps we have set out on South Seymour and then sail to Conway Bay where we shall do some more diving. Me for diving where there aren't any sharks around—even little ones!

Jan. 14.

When I got up this morning we were well under way and South Seymour was disappearing in the distance. Frank Wonder had collected his traps and found another new species of rat before we sailed (see Appendix).

I took movies of all the turtles together (one sea-turtle had escaped during the night by jumping overboard through the companion-way), and then one of Jimmy the penguin who would not stand still for even a minute.

We reached Eden Island, which is very small and steep, about ten o'clock in the morning and tried diving again. I spent so much time taking movies of the diving that I was able to go down for only a short while. I could see much better than last night but it was not very interesting because we were on a sandy bottom and there were almost no fish around.

We returned to the *Illyria* for a late lunch and spent most of the afternoon trying to start one of the outboard motors.

Jan. 15.

We left our anchorage at Eden early this morning and cruised under motor-power to Charles Island—a distance of about fifty miles.

During the morning Bill Dwyer, the steward, and Bert, one of the cooks, killed one of the sea-turtles and opened it up. Inside they found nearly a bucketful of small yellow eggs and 102 full grown eggs the size of golf balls. The large eggs, which are perfectly round and smooth, have flexible shells which allow them to be bounced on the deck without breaking. We tried eating some for lunch but found the taste to be only moderately pleasing. Turtle steak is very good, however.

In spite of having three more turtles in the larder we are running short of meat for our long 3,000 mile voyage from here to the Marquesas. We have heard that there are wild cattle on Charles Island and the reason we have come here is to replenish our stores.

When we arrived this afternoon, we went to a house which we saw on the shore and found there two natives of Ecuador. Schmidty has been to South America and was able to speak to them. It seems that the house is owned by a hide dealer named Olsen and these two men are his hunters. Olsen became sick recently and sailed away in his small boat to another island for medical attention. The hunters have nothing to do in the meantime so one of them has agreed to lead us to the hunting grounds tomorrow. He has warned us to be prepared for a long hard journey to the rain slopes of the mountain region, inland.

Jan. 16.

Two months ago today we left Boston and today has been about the most strenuous of the whole sixty—though I can look back on its events with neither pride nor pleasure.

We got up at 3:45 A.M. and put on our heavy boots, first covering with adhesive tape the blisters which we had gained on Indefatigable. We had a quick breakfast and got ashore just before dawn.

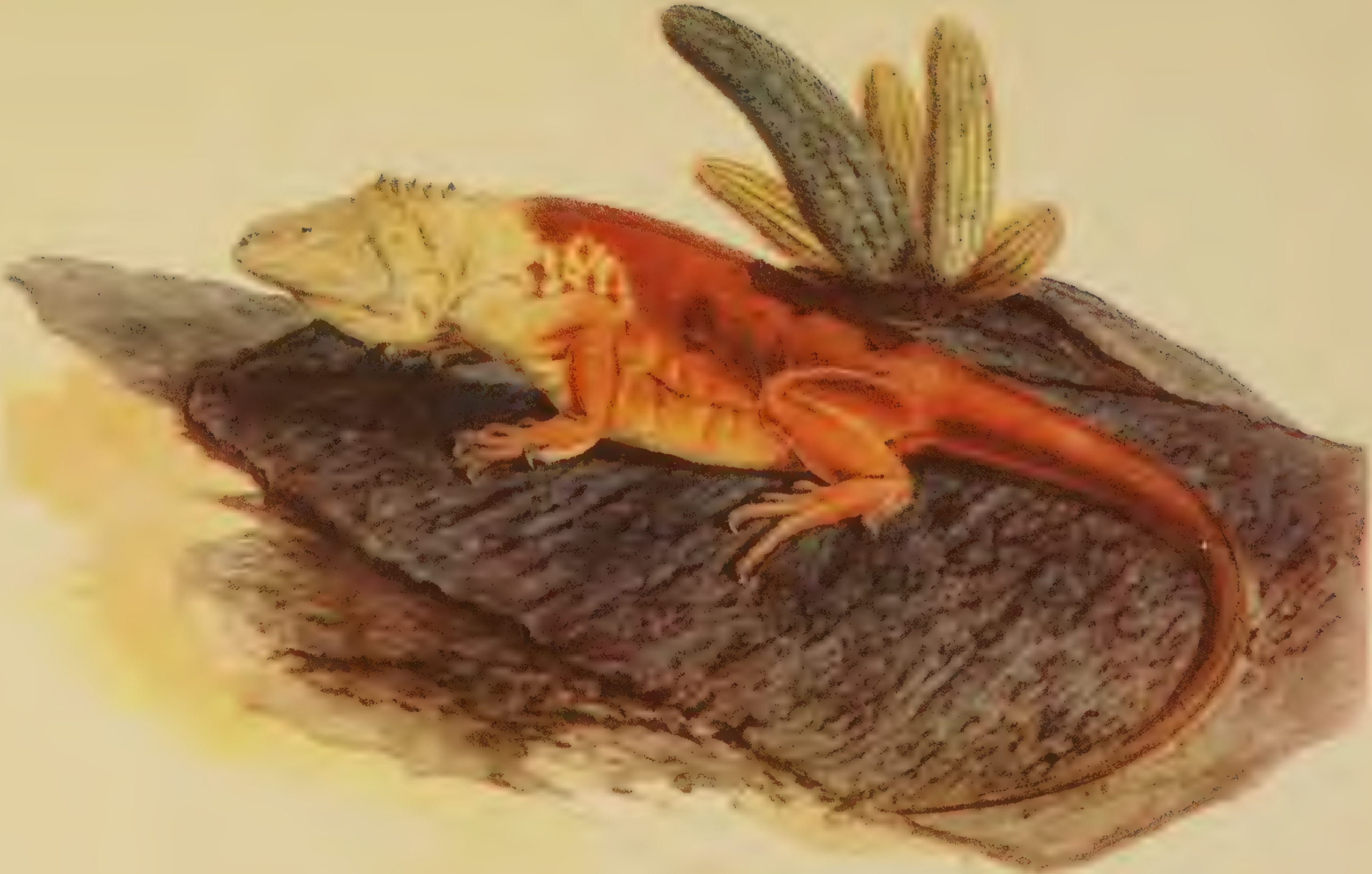
Our guide glided out of the shadow of a cactus plant and with hardly a word of greeting started off up the rough trail at a tremendous rate of speed. We straggled along after him, keeping up as best we could, and a very rag-a-muffin group we looked, for each man had dressed himself with any old clothes he could find. There were Cornelius, Chuck, Murry, Schmidty, and myself. Also Bert, the second cook, Bill Dwyer, the steward, and Mr. Cook, the mate. Then came six sailors—the two Sidelinker brothers, the two Boutiliers, Small and "Dutch" Hollander. We all carried canteens and food supplies; Bert was armed with three large carving knives and Schmidty and Cornelius each carried a Springfield rifle.

The Ecuadorian was a man of iron for in spite of the fact that we were following a rough rocky trail uphill he was averaging a good four miles an hour. As at Albemarle we started in a terrain of small leafless bushes with snow-white bark, which closed in on the trail so that their wicked thorns scraped as we went by. Then as we gained elevation the trees became taller and greener. The thorns also increased in length and number.

At the end of two hours we had gained the shoulder of a mountain and the rain clouds drifted close above us. There was coarse green grass growing and little song birds could be heard and seen in the thicket. Every few minutes we would come upon a small open space resembling an upland pasture such as one finds in the Big Horn Mountains at home. In these pastures bloomed little flowers. The surrounding vegetation was luxuriant and the whole aspect entirely different from that of the coast.

Our guide motioned to us not to speak and to load our guns. We followed him in single file, sneaking along like Indians. Cornelius had one rifle and I the other. Once a young bull rushed past a small break in the thicket. Cornelius fired a chance shot, but missed.

Half an hour later the Ecuadorian made motions for us to be on our guard again, and rounding a corner in the underbrush we came suddenly on a large open field nearly half a mile across. At a distance of over 400 yards was quite



GALÁPAGOS GIANT LAND IGUANA
Conolophus sub ’cristatus [Gray]
Narborough Island, Galápagos

a large herd of cattle but the moment we appeared they sniffed nervously and then began to run.

"There goes our meat!" yelled Cornelius. "Shoot quick!"

We each fired three shots and one of the animals dropped. The rest stampeded into the thicket and were lost to sight. We ran forward, but before we had gone a hundred feet the wounded animal struggled to his feet and ran off into the brush at our right.

I hurried to the spot where the bull had dropped and then turned, following the direction it had taken. After a few minutes walk I heard a wheezing noise in the thicket and peering in saw an indistinct brown form moving about. I glimpsed a tawny back but then the animal turned and began to run away. I fired quickly and the brown form dropped with a great crash.

Followed by the Ecuadorian and one of the sailors I rushed to the spot. We found a terrible thing had happened. It was not a bull I had shot but a beautiful brown horse!

The sight upset me terribly, especially as the horse, though struggling, was fast dying. There was nothing to do but fire another shot into the poor animal's head.

"Bang!" went the gun and the horse lay still. The sailor shuddered and the Ecuadorian jabbered to himself in Spanish, making the sign of the cross. In the distance somebody yelled "Sid's shot a pretty, brown horse." They were all so flabbergasted that no one even thought of chiding me about it. Cornelius however, who had been at a distance, thought I had shot a bull and came up to congratulate me. I had to explain it all to him.

The guide said the horse was one of five which have been left recently to run wild on the island and to increase in number.

Feeling that I had done entirely too much shooting I gave my gun to Chuck and trailed behind the rest of the party. We tramped for over a mile in complete silence. Finally we reached a little pond on which several pretty and tame little ducks were swimming about. They served to take our minds off the recent tragedy.

On the further side of the mountain a cow ran across in front of us and Chuck rushed off in pursuit of her. Hardly had he gone than we heard a snort to our left and looking around saw five bulls looking at us from a rise in the ground about 100 yards away.

Cornelius raised his gun and at the same time the bulls began to run across in front of us. He fired two shots but only wounded one slightly. All five bulls turned and ran directly at us. Cornelius's gun was empty and he had to stop to reload.

I dashed to a big rock and climbed up on it but the rest of the party, though unarmed, held their ground. When the charging animals were only sixty feet away Cornelius brought his gun into action again and knocked one down with the first shot. The rest veered to the right and passed by us, a short distance away. Cornelius fired again and another one dropped.

Our crew were like savages. They drew out knives, hatchets and saws and made very short work of skinning the two bulls and butchering them. Within half an hour they had all the important pieces ready to transport.

In the meantime we made a check-up of our party and found that the two Sidelinker brothers and Small had disappeared. They had not been seen since near the start of the trip, at which time they were some distance behind. This was very disturbing not only because we had counted on them to help carry the meat but also because they had with them half the food and water.

We at once consumed the other half of the food and a lot of the water, for we were very hot and tired. Then we began to consider how we could get home, for there we were in a prickly thicket, eight miles from the *Illyria,* and with a thousand pounds of bloody meat to carry.

We finally gave up waiting for the others and decided to carry back as much meat as we could ourselves. The guide refused to take any. Schmidty put the livers in his knapsack and carried both the rifles as well. Bert the cook, slung a whole hind quarter over his shoulder, smiling although the blood dripped all over him. Mr. Cook, following Bert's example, took off his shirt and slung a side over his shoulder. His undershirt turned bright crimson. Hollander took another side and tied it onto his back with ropes but the ropes chafed, so he put fresh bloody hide under the ropes for padding. The rest of us tried to keep a little cleaner by tying the meat to sticks.

Then staggering under our messy burdens, we began the long trip back to the shore. As we had gone more than half way around the mountain our guide said it would be shorter to continue all the way around to get back, but neglected to mention that it would be rougher and thornier.

So we toiled along getting bloodier and bloodier, followed by flies, tearing ourselves on thorns, and blistering our feet.

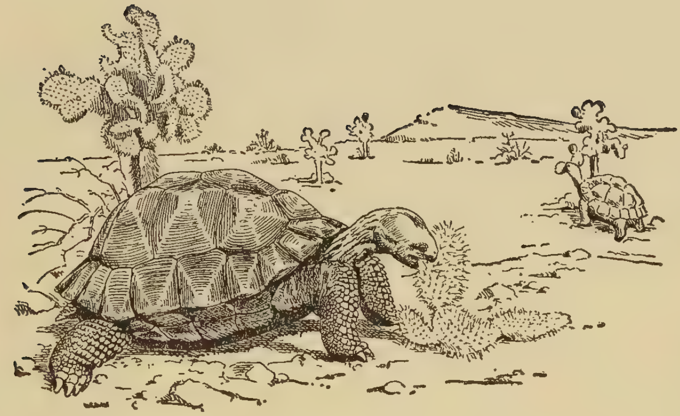
The stick on which Chuck and I carried our meat cut into our hands and I had a dead horse on my conscience as well. Wearier and wearier we grew—the rests became more and more frequent and soon all our water was gone. The sweat rolled off us in bucketfuls and the nearer we came to the sea, the hotter and drier it was.

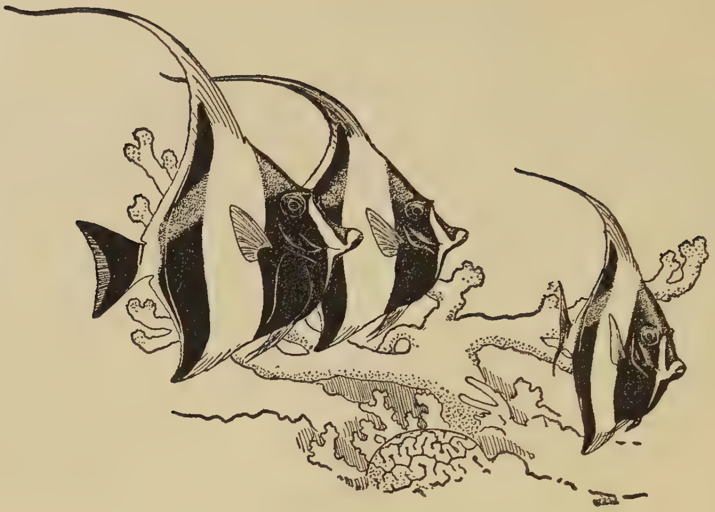
At one time Chuck and I got so far behind that only my police whistle stopped the rest of the party before we got lost in the thicket. After perfectly endless marching and struggling, tripping and tearing, blistering and swearing we reached the shore. Except in crew races I have never been so exhausted in my life. Plainly, cattle hunting is not my métier.

I went to sleep as soon as we got back to the boat but Schmidty woke me up about five-thirty. He had "found" with the help of the Ecuadorian a big cave with extinct turtle shells in it, and wanted me to go down into it with him to take flashlight photographs.

We let ourselves down a dark narrow shaft with a long rope and came into a large underground cavern. There were no good tortoise shells in this cavern for Schmidty says that Dr. C. H. Townsend had been there ahead of us but we found another adjoining cavern which Dr. Townsend must have overlooked for therein we discovered several dozen shells of the extinct Charles Island tortoise, three in perfect condition. Schmidty is delighted to secure these shells for the museum, for this type of tortoise has been extinct for more than a hundred years. The ones we found must have fallen down the shaft and died in the cave through lack of food. We took several photographs showing the shells in the position we found them.

One good result of the cattle hunt was that we now have enough meat so that we can start for the Marquesas tomorrow morning at sunrise. I shall be sorry to leave the Galápagos, which are certainly the strangest islands I have ever seen, but I feel rather an unwelcome guest here at Charles Island. Chuck Peavy is looking for a special record to play on the Victrola. The name of it is "Horses."





CHAPTER VI

CRUISING SOUTHERN SEAS

THREE thousand miles of rolling seas—three thousand miles of blue sky and three hundred thousand fleecy white clouds are all that lie between the Galápagos and the Marquesas Islands. Time is non-existent;—there is only a succession of day and night, a coming and going of the sun and a rising and falling of the wind.

On such an elemental and unchanging landscape the little *Illyria,* a mere speck in an infinitely wide sea, seemed forced to struggle to maintain her identity. Inevitably we also found ourselves under an unconscious strain. Whenever a group of men are cooped up together over a long period of time friction is bound to develop. Although we got along together unusually well on the whole there were times when we found ourselves no exception to this rule. Ridiculous as it sounds now, there were days when any small irritation was apt to seem sufficient cause for a life-long hatred.

Dr. Herre had been to the Philippines and did not mind telling us about it. Sometimes he forgot what he had already told us and repeated it. In the backs of our minds the Philippines loomed larger and larger—more and more threatening. To our oversensitive mood it seemed that ten minutes never passed without a mention of these islands. They were like a thunder-cloud all around us.

Conversation at table languished—everyone ate and ran—perhaps even climbed up onto the mast where the Philippines couldn't follow. Tempers became shorter and shorter—the scientists became more and more icily polite to each other. In my diary I find recorded a rather typical pointless conversation which took place at dinner one night.

Schmidt (after a long silence): "Cornelius, I have just thought of a great idea for a joke which we could have played at Bermuda. We could have wirelessed home from there that the whole island had disappeared in a volcanic eruption and we found nothing but a cloud of smoke over the water. What a stir that would have made!"

Cornelius: "Ha! Ha!"

Dr. Herre (very quickly, although not spoken to): "Well, I'd be careful if I were you Schmidt because everyone knows that Bermuda is made of coral, not volcanic material, and they wouldn't think that joke very funny."

Schmidt: "Why, I understand that the coral has formed on a volcanic cone, but it doesn't make any difference anyway."

Dr. Herre (warming up): "Oh! yes it does! I am afraid you are quite mistaken about that!"

Schmidt: "Well, as a matter of fact you yourself were the one who told me. Besides it said so in the guide book!"

Dr. Herre (with airy gesture): "Stuff and nonsense; If I did I was dreaming! And what does a guide book know about it?"

Chuck Peavy (who has had to wait all this time): "In the guide book it said they made borings and that the material drilled out was found to be volcanic."

Dr. Herre (with highly insulted snort): "We'll see about this!" (He leaves table and gets out Volume B of the *Encyclopedia Britannica* for 1900) "See there! 'Bermuda may be on a volcanic cone but it is very doubtful'."

Schmidt: "Of what date is the *Encyclopedia?"*

Dr. Herre (carefully looking in wrong place for the date): "It doesn't say—I don't know!"

Schmidt: "Well I do. It is 1900 so don't you read it to me because my guide book is for 1928."

Dr. Herre (trying to wriggle out): "As for those borings—you've heard of salted lead mines and salted silver mines? Well they probably salted the borings, that's what they did and what's more when I was in Mindano——"

Schmidt (knowing that Dr. Herre won't play cards): "What about a game of poker boys? I'll get the chips."

Nor did the crew pass the nineteen day voyage without their troubles; even the officers found difficulty in keeping peaceful. Captain Boutilier is a serious-minded man and a teetotaler. Right across from him at the officers' mess sat the chief engineer, a husky, bull-necked Irishman who loved to boast of the days when he had been a successful bootlegger.

"I got my start when I was engineer of a large British steamer which hung off Sandy Hook with 60,000 cases," he

A Hearty Meal while the Seas Are Smooth

would say. "Once I kept up the steam when the Captain had told me to bank the fires and in that way was able to avoid the seizure of the ship.

"Then I went into business for myself on land and made my headquarters at Newport. My partner and I saved enough money to build a speed boat with two 300 horsepower engines. She could make 37 knots with a full load.

"We always notified the police before we pulled off a stunt, so as to avoid any unpleasant disturbance. Our profit was $2,000 a night. I even had to pay $1,800 income tax."

When the engineer reached this part of the story the Captain would have become white with rage at the idea of eating at the same table with such a man, but the engineer would brook no interruptions. His story would go on through a long series of hair-raising adventures which varied with each telling. The end however was always the same.

"After a few years the old easy ways began to go," he would sigh regretfully. "The police, instead of remaining the upright honest type who would take a man's bribe and then leave him alone—gave way to the dishonest type who would first take the bribe and then seize the liquor. So I had to go to work!" At this point the Captain would stalk from the table.

And so at the end of three long weeks during which we alternately ploughed along under the motor and sailed under moderate breezes, the Marquesas came up over the horizon. No one was sorry to see land. We welcomed the prospect of setting foot on something solid.

The Marquesas were sighted early in the morning of February fifth. They appeared low and small at first, but this was because the nearest was all of fifty miles away. As we drew nearer we could see several distinct mountainous islands which rose precipitously from the waters edge to such a height that their summits were above the clouds. The nearer we got the higher they looked.

About two o'clock we reached Atuona Bay in the island of Hiva Oa. On its steep shores was a large cocoanut plantation and several little wooden houses with red roofs.

All nine of us climbed into the skiff and attempted to make a landing but a native policeman dressed in little save a red straw hat motioned us away. To Chuck's elaborate French he only replied that he didn't speak English.

Then a white man in white clothes and a pith helmet appeared and told us in French that we could not land until we had been O. K'd by the doctor. We had to wait nearly two hours for this medical man who finally arrived in an outrigger canoe and gave his official consent.

At last we went ashore and landed on some rocky steps. We walked about a mile around the promontory which formed one side of the bay and found on the other side a sandy beach half a mile long beyond which rose a tremendous mountain, one of the steepest I have ever seen. Behind the beach was a vast cocoanut grove and through the myriad slanting trunks we could see a few houses and a radio tower.

One house situated in the middle of the grove, belonged to the governor of the Marquesas—Monsieur Armont from Paris. He received us with great cordiality in voluble French. Cornelius, Chuck and Murry did their best to talk to him—the rest of us were frankly unable to.

We learned from the governor that disease has been pre-

Anchored at Hiva Oa in the Marquesas

Drying the main-sail after our eighteen-day voyage

valent in the Marquesas since the advent of the white man and nearly all of the true natives have died off. At present there are only 300 inhabitants on this large and beautiful island and many of them came from Tahiti and other outside places. There are only 3,000 inhabitants in all the Marquesas, and the population is still decreasing.

Most of the natives we did see were either sick or very old and feeble—not just what one might expect after reading some of the popular South Sea novels. There was something very depressing and decayed about the whole atmosphere.

Nor is the island a good collecting ground for scientists. There are no mammals or interesting reptiles, and what few birds can be found are well known. There are some ruins of moderate anthropological value but the governor told us that the most interesting remains of the former high civilization could be reached only by a ten hour ride on horse-back. Cornelius wanted to make the trip but the rest of us voted it too long a journey.

That night the crew went ashore to celebrate; they returned to the ship very late and very drunk. The third engineer lost his grip as he was climbing aboard and fell overboard, narrowly missing the skiff with his head as he went down. If he had hit it he probably would have been drowned, for the night was pitch black and the water very rough. The Captain was righteously disgusted.

While I wasted a weary day trying to make the motion picture projector run on the inadequate current of the radio station, most of the others went on horses borrowed from M. Armont, the governor, for a ride over the mountain trails. Having enjoyed themselves thoroughly, they returned late in the day, very stiff and tired. They reported that the flowers and foliage of the upper levels were quite different and far more beautiful than those below.

They all went ashore again about sunset time to have dinner with the governor and two visiting English scientists who had come down from the hills at the news of our arrival. Walt, Frank and I stayed behind rather than attempt to speak French.

At ten o'clock the diners had not returned, so I gave up waiting for them and went to bed. Just as I was about to drop off to sleep I heard loud voices from above. Then came Murry's voice outside my door. He was pleading with Chuck "not to wake up poor old Shirtle." There was a short silence and then a terrific crash. I opened the door and found Chuck and Murry in a heap on the floor. Commander Crane stood by and in French exhorted them to beg a thousand pardons.

In spite of many questions I could only learn that the governor was a fine fellow and that the Englishmen had been left far behind. Determined to learn the truth, I sought out Schmidty. His appearance only confirmed my worst fears.

. . . .

Since there was very little of scientific interest at Hiva Oa, we sailed away the following day, and reached the Island of Nuka-Hiva the next morning. We cruised into beautiful Taiohae bay just after sunrise and were rewarded for rising early by the sight of thousands of pink clouds floating on the crests of the jagged range which encircles the bay.

We went ashore after breakfast and moored our launches to an old wooden pier which protruded into deep water. We found the head of the bay to be a wide beach nearly a mile

A Future Belle: Nuka-Hiva

Telephoning in Taiohae

long, with twenty or thirty small houses set in a cocoanut grove beyond it.

No sooner were we landed than a troop of small children, all dressed in clean gingham clothes and wearing wide brimmed straw hats came running down to see us. They were all beautiful, well formed little Polynesians and their friendly smiles and greetings betrayed no sign of fear or shyness.

When the children saw my camera they grew very excited and when I let them look into the finder they fairly squeaked for joy. I photographed several of them and each one said after I had taken the picture, "Thank you, mister, O. K." This was all the English they knew.

One of the older boys had rigged up a toy telephone with two tin cans and a piece of string. I listened at one end of the line while he shouted very seriously into the other. I let him know by signs that his contraption was "O. K." and he went away grinning from ear to ear.

We walked along the beach past the houses and a rude church. Several women sitting outside their huts nodded to us in friendly fashion but otherwise paid no attention. We found that they are used to white people because a colony of poor Czecho-slovaks have come to the island and are working a fruit plantation on the rain slope of one of the mountains.

At the further end of the beach lay the scattered remains of an American trading ship—the *Carrie M. Campbell* of Seattle. How she could have become so badly wrecked in such a quiet bay was a mystery to us. It must have been a terrible storm that destroyed her.

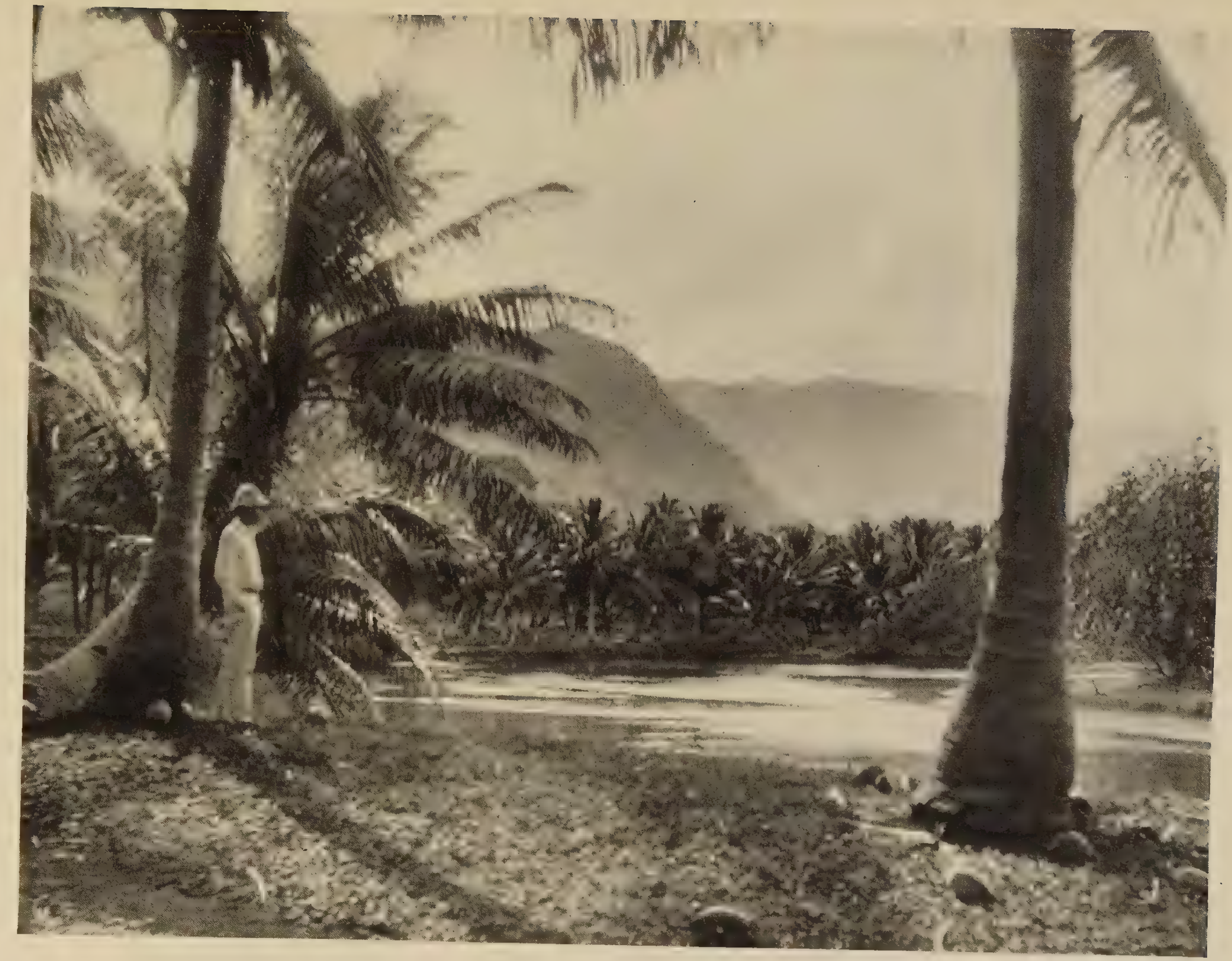
Back at the pier we found Mr. Cook draining water from an iron pipe on the pier into the best whale-boat. We thought it rather a foolish thing for him to be doing until we learned that it was good drinking water and that the boat was the only conveyance for it he could find. We had been nearly seven weeks—ever since we left Panama—without replenishing our supplies, and the water in the tanks was very low.

The fuel and lubricating oils had also dwindled away and we were again short of meat. The Captain thought he could reach Tahiti by carefully conserving the oil and using sail whenever possible but the meat supply demanded immediate attention. We secured permission from the French Resident to go on another cattle hunt.

During the afternoon of our first day Cornelius and I made a trip to Typee Valley, Herman Melville's famous vale. We loaded the outboard motorboat with gasoline, food and cameras and set out northeast along the coast. As we reached the open sea the waves increased in size to such an extent that we had to throttle down the motor to avoid being swamped, and so it was several hours before we reached a point only ten miles from where we started.

Once inside the bay at the foot of the valley we made much better speed. On either side the mountains rose precipitously to a height of several thousand feet and we could see numerous herds of wild cattle and goats grazing on the steep slopes. I fired several shots into the air to alarm these animals. When the sound reached them they were off at lightning speed, jumping over obstructions like mountain sheep and starting small landslides which rolled noisily down into the valley below.

We beached our boat at the head of the bay and went ashore into a large cocoanut grove. Several raggedly dressed,



Melville's Vale of Typee

undersized natives came to meet us. They did not seem surprised at our arrival and losing interest, soon went away.

The late afternoon sun shining obliquely down on the myriad palms cast long cool shadows which invited us to enter the grove. We followed a narrow trail beside a winding brook and picked brilliantly colored flowers as we went. A small brown boy ran out from a half hidden hut and offered us a freshly opened cocoanut full of cool, sweet milk.

We stopped to drink the milk and to enjoy the magical beauty of the green valley. But we could not forget the terrible effect the advent of the white man has had on the natives who once lived here. The white man's armies, his liquors and his diseases have, within a few generations, driven a thriving race of natives to sickness, poverty and the verge of extinction.

Signs of the old civilization were all about us—rough stone images, foundations for houses and long stone terraces. They are deserted. The present natives cannot use even one-tenth of the cocoanuts which hang from the palms. Somewhat depressed, we made our way back to our boat and returned to the *Illyria.*

Before sunrise the next day we sent the scientists ashore to work and at the same time we took aboard several native guides who were to help us with the cattle hunt. After cruising up the coast for twelve miles we went ashore and spent nearly all day tramping the mountainsides in pursuit of the elusive game. Cornelius finally shot a fine bull and, as we had done at Galápagos, we wearily hauled the meat to the shore.

The scientists, in the meantime, had had a far more exciting time. Dr. Herre had persuaded some of the natives at Taiohae bay to help him cast his big seine. The very first haul resulted in the capture of no less than 10,000 fish. Most of them were a type of mackerel about six inches long and the weight was so great that it took nearly half the population of the village to pull the seine ashore. The beach was alive with gleaming silvery shapes, and when the net was emptied the natives ran to their houses for receptacles to put them in. No such catch had ever been made in the bay before and everyone rejoiced at this addition to the food supply. When we returned in the evening we saw long lines of fish drying on ropes stretched between the trees. And Dr. Herre was so jubilant he forgot about the Philippines!

Schmidty and Walt had also met with adventure. They had attempted to climb the high mountain range back of the beach to secure a photograph of the bay, which is really a remarkable geological formation. After they had struggled about half way up a steep cliff part of the ledge behind them fell away so that they could not go back. Then they reached a point where it seemed impossible to go forward either. They finally managed to scramble up the cliff by taking desperate chances. When we saw them they were still a very frightened pair.

By evening we were all so exhausted that it was obvious we would have to rest the next day on board ship, so it was decided to push along toward the coral atolls which lay a few days sail to the west. We left Taiohae just at sunset and the children came down to the pier to wave their straw hats at us in farewell.

The next day the wind was very light, but the Captain stuck to his resolve about saving fuel oil and we made less than a hundred miles in the twenty-four hours. That night, as the

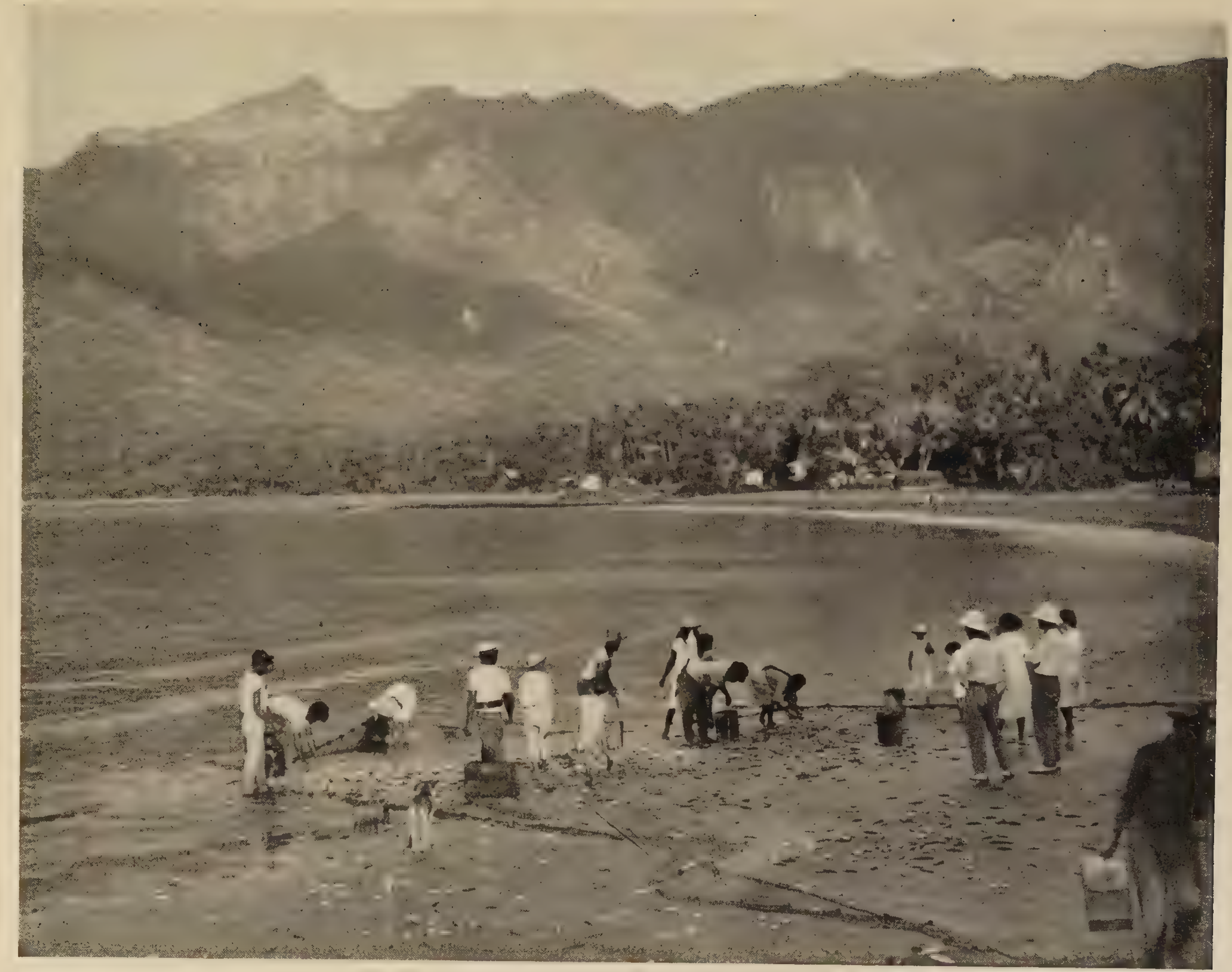


Photo by K. P. Schmidt

Miraculous Haul of Fishes on the Beach at Nuka-Hiva

Illyria wallowed in the calm with all sails set a sudden squall struck her. She heeled over so suddenly that some bottles in the laboratory crashed to the floor. I woke up and rushed to the deck.

The whole crew was already there in the black darkness shouting orders and hauling on the ropes. The difficulty with a brigantine rig in such a case is that it is impossible to come into the wind and to lower the main sail without backing the square sails. If the wind is very strong it causes a dangerous situation, as the foremast may be blown over backwards. Luckily for us the wind fell off in a few minutes and although it was followed by a driving rain, the sailors were able to trim the canvas. The next morning we had a fine sailing breeze and cruised along at nine knots.

About noon Takaroa, one of the islands of the Tuamotu or Low Archipelago, came into view; a long low line on the horizon. As we came closer we recognized it to be a typical coral atoll. There was the thin oval of coral formation and inside was the enormous lagoon bordered by a long beach. There were the palm and other tropical trees growing in great abundance.

We wished to land at a village which had been built along one of the inlets to the lagoon. The inlet looked fairly deep but it was narrow and a recently wrecked ship on the shore warned us to be careful. Captain Boutilier took careful soundings and decided it would be unwise to try to enter lest the swift tidal current would carry us onto the reef. On the other hand, he would anchor offshore in the open sea for fear of a change in the wind which was very strong. He solved the problem by telling us to go ashore in the skiff, leaving him to tack back and forth offshore.

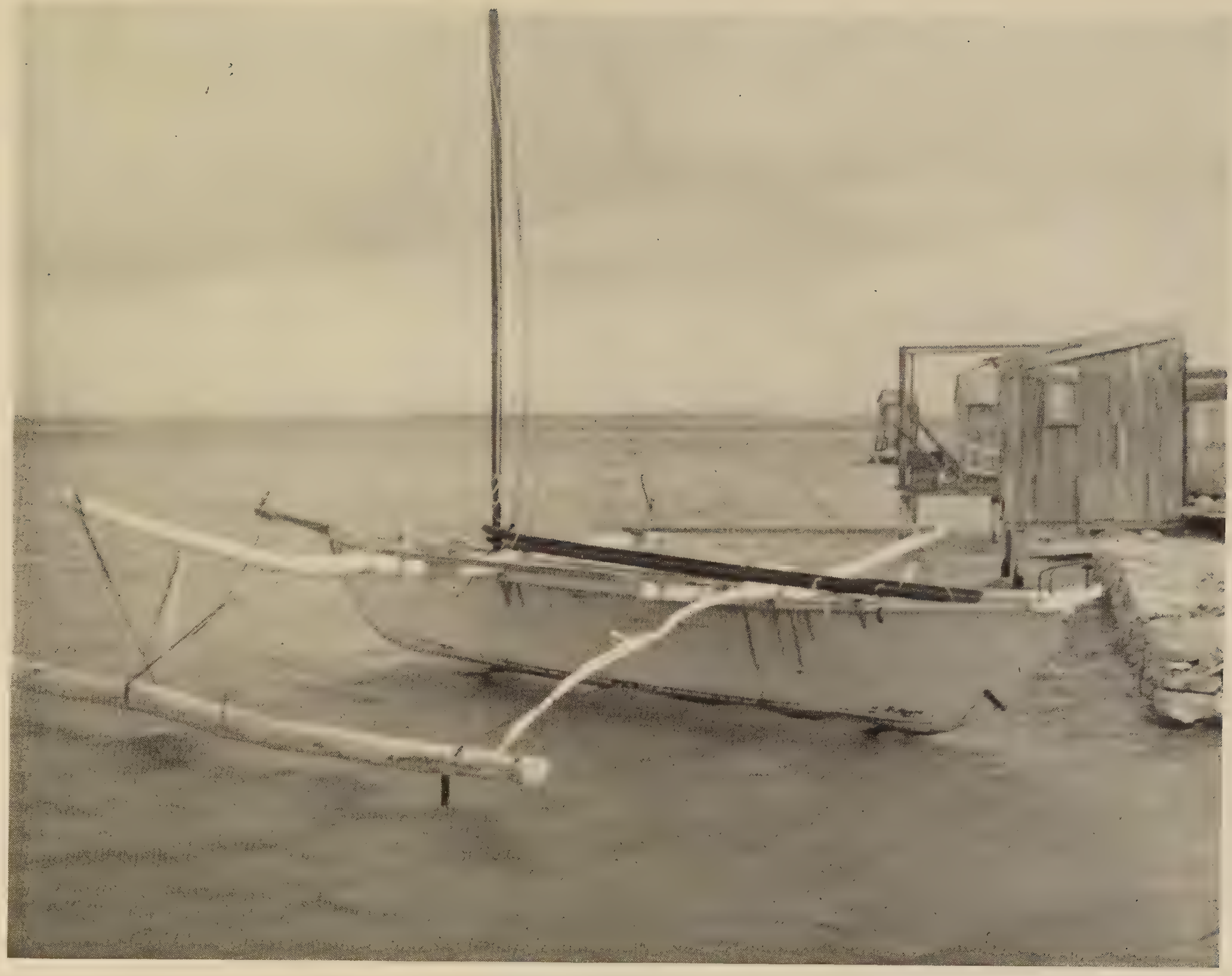
At least a hundred natives, mostly dressed in undershirts and ragged trousers, were waiting for us at the rough landing-place. They were so interested in the outboard motor, and crowded around so closely that we were barely able to get ashore at all.

In the crowd was one white man—a young Mormon missionary named Adams. He told us that we had come to one of the biggest pearl diving villages in the Archipelago. The boys are trained to dive at an early age and each year learn to go deeper. The best swimmer at Takaroa can go down more than a hundred feet and can remain under water more than two minutes.

"They are intelligent happy people," said Adams, "and I try to serve them more as a teacher than as a pastor. Each year there is a certain season during which the French government allows pearl diving and at that time the natives work very industriously. They do not search for pearls but for the shells and these they sell at a fixed rate per ton. This gives them money enough to buy luxuries from the trading ships that put in here every two months. This is not the pearling season but if you will come with me I can show you where some of the best divers are now fishing."

He led the way through the small town toward the lagoon. The houses, which were made of thatched palm leaves with floors of driftwood were clean and neat compared to those of the Marquesas. They were located along straight paths and the boundary of each lot was marked.

Back of the dwellings were the boat houses, for each family



Native Outrigger Canoe in the Tuamotus

These boats can make 18 knots under sail

owns at least one sailing canoe, and these are remarkable craft. Even the larger canoes have hulls not more than a foot wide and many are so narrow that the feet of the owner must be hung over the side. A strong outrigger is used to keep the boat steady and in a fair breeze the pilot sits on the outrigger to keep from overturning. The mast is steadied by guy wires and supports a leg-o'-mutton sail. The craft is so light that it can be paddled at a rate of eight knots and will sail at better than fifteen. Nevertheless, it is very seaworthy and even the small children are allowed to sail alone.

Back of the boat houses the shore shelved off steeply as if some current of the lagoon had cut a channel there. Several men were sitting on the edge and looking into the water.

"See those fellows wearing the red lava lavas and water goggles," said Adams. "Those are the divers. They are looking for fish and if they see any good ones they will go down and spear them."

Each diver had a sharply pointed spear about ten feet long and each wore a small pair of brass-rimmed goggles at the top of his forehead. As we looked one husky fellow jumped into the water up to his waist and pulled his goggles down over his eyes. He took several breaths, each so deep that the wind whistled through his throat and nostrils. Suddenly ducking under, he was gone.

We saw a shadow glide away under the surface and then the handle of the spear momentarily flashed in the sunlight. After that the water remained unruffled for over a minute. Then the diver thrust himself into view at least a hundred yards from where he had gone down. Transfixed on his spear was a beautiful pink and scarlet fish. He flashed white teeth in a dazzling smile and coming toward us laid the fish at our feet. Again and again the divers went down and seldom did one come up without a fish.

Dr. Herre, especially, gasped with amazement for several of the fish were unusual specimens, which he had been unable to catch with hook, net or dynamite. We later tried to spear fish under water from our diving helmets but never succeeded; we could not move fast enough. The performance of these divers was little short of miraculous and we never saw it repeated or even approached at any other island. Try to manage just once a ten foot wooden spear under water and swim at the same time with the other hand!

Adams led us back through the village to a house where some pearl shells had been stored. He opened a wooden box and took out several large flat shells which glistened alluringly on the under side.

There was more in the box than shells, however, for it had hardly been opened when a swarm of gigantic cockroaches came scattering out. To my horror I saw they were heading for a baby who was sitting on the floor. The baby was dressed in nothing but an undershirt. He saw the cockroach army coming, but instead of getting out of the way he pounced upon the two leaders of the expedition, and holding one squirming insect in each chubby hand he laughed loudly and then dropped them both down inside the neck of his undershirt! What a joke! The natives and Adams all roared with laughter at baby's putting live cockroaches inside his clothes! Wasn't he cute?

While we had been watching the divers Walt Weber had made great friends with several of the native girls. He could

A PEARL DIVER OF THE TUAMOTUS

The small goggles enable him to see clearly even at a great depth

not speak to them but he had taken out his drawing block and had made a quick sketch of each one. They were greatly pleased and when we arrived there was a large crowd waiting to be drawn.

Adams spoke to two of the older men and then turning to us said, "The chief would like to have you all come ashore tonight. He will ask the girls and some of the men to dance for you. It's worth seeing, for they do some of the very ancient dances which have been handed down for generations."

We said we would come if we could but it seemed doubtful, because the Captain was unable to anchor and it would be rather difficult for him to beat back and forth offshore all evening. When we reached the ship we explained the dilemma to the Captain.

"All I need is a light on the shore to steer by," he said. "You take one ashore with you and leave it where I can see it. That's all I need—you can stay as late as you want."

While we were eating supper night fell and even the outline of the island was lost in the inky blackness. Nevertheless we put our cameras and flares into the outboard launch and started ashore. We found ourselves alone in a small boat in a fairly rough sea, and the sensation was rather a queer one, for we could see nothing nor hear anything but the roar of the motor. We flashed our hand lamp in all directions and finally saw an answering dot of light in the distance. How we ever got through the breakers and into the narrow inlet without at least a minor mishap is still a mystery. We simply steered for the dot of light and eventually reached it.

The natives were in a high state of excitement and led us at once to the council house in the center of the village. It was a large thatched-roof building, open on three sides. Along the fourth side was ranged a row of wire chairs such as one finds in ice-cream parlors at home. These must have been purchased after a particularly successful pearling expedition.

Adams, interpreting for the chief, told us that the chairs were for us. He then hung a gasoline light from a rafter over our heads and left us sitting in its full glare, as if we were the principal exhibit. A native audience numbering several hundred faced us from the other end of the room.

Then came the first major surprise of the evening. The orchestra struck up a tune. Remember—we were four thousand miles from America and nearly a thousand from any white civilization. Then consider our astonishment when we heard the familiar strains of "Yes, Sir! That's My Baby" played with two violins and two ukeleles.

Our amazement increased when the dancers appeared. The men were dressed in blue silk shirts, white flannel trousers and new white shoes. The chief even had a leather belt with his initial engraved on the silver buckle. And the three girl dancers wore pink and white short-sleeved dresses, and high-heeled slippers. Each man clasped a partner in his arms. The dance was a rather intricate variety of the fox trot!

"For the love of Mike!" I said to Adams. "I thought we were in the South Seas—not at a tea dance at the Copley Plaza. How come?"

"It's not hard to explain," answered the Mormon. "When I came I brought a victrola and some records, and also some picture magazines. The natives were fascinated by the music and the pictures—so much so, in fact, that they urged me to send away and get all this stuff. And now they are having the time of their lives playing at being white people."

The dancers were certainly enjoying themselves and soon lost the conservative aspect which they had worn at the beginning. Presently the chief came up to me and began speaking.

"He wants you to do 'the white-man's crazy dance,' " said Adams. "That's the native name for the 'Charleston'. "

None of us were well enough versed in the arts of our own country to be able to gratify him.

"Never mind," said Adams. "The chief will do it himself."

And the chief did! I have seen some remarkably intricate varieties of the "crazy-dance" on the stage at home, but nothing to compare with the contortions and revolutions which the chief achieved. He must have been double jointed all over—and how the audience did roar and yell. However, there was one trick they were not "on to." We clapped our hands in applause and the dancers were so surprised they stopped in the middle of the dance. They had not heard of the custom of banging one's hands together and it hardly seemed reasonable to them. We had to apologize for the disturbance.

"So this is the dance which has been handed down for generations!" laughed Cornelius.

"Oh! they can do that, too," said Adams, and whispered to the chief.

The chief gave a short command and the dance changed as if by magic into one of the most primitive of hula-hulas. Instantly we forgot the modern clothing for the rhythm and the symbolism of the dance were as ancient as man himself.

Everyone was excited—the dancing became faster and faster and the motions more and more crude. The audience maintained an unbroken cheer. Suddenly the dancing girls left their partners and approached Cornelius, Chuck and myself—still dancing. They stopped squarely in front of us—held out their arms and shook their hips. The invitation was so obvious that we could not refuse. Each of us grabbed a girl and swept into the hula-hula ourselves. And the audience laughed so loud that the Captain heard them two miles out at sea!

Shortly before midnight we lit our magnesium flares and took a movie. By the time that event was over the dancers were exhausted and half blinded by the bright lights, so we said goodnight to all and puttered away out to sea to find the *Illyria.* I shall never forget "our coming-out party" at Takaroa.

The *Illyria* continued to cruise back and forth off shore all night and the next morning we went ashore again. The dancing girls who had been so bold the night before ran away when we approached the shore. The chief was cordial, however, and took us to a fish trap which had been built on the coral reef near the village. The trap was a simple contrivance—merely a maze of coral walls which stuck up above the water level. Any fish that wanders in is unable to find the way out.

When walking on the coral reef one has to be careful not to step on poisonous-spined sea-urchins or between the shells of the huge mussels. The latter are often over two feet long and lie embedded in the corals with their long jagged shells open toward the sky. If a man puts his foot into the hole the shell snaps shut and holds him so fast that sometimes the ankle is fractured by the pressure. Such a catastrophe is bad enough

Shoals of Groupers Darted Past the Under-sea Camera

in shallow water, but Adams told us that several of the pearl divers have lost their lives by being thus forcibly detained under water.

After a picnic lunch on the shore of the lagoon we sought shelter from the sun in a palm grove. So had an enormous swarm of black house-flies. They descended on us and we had to take to our boats to escape. Even this ruse was not sufficient, for the flies followed us and continued to bite. Finally we had to go out to the *Illyria* and hide behind the screens with which she was equipped. The flies settled all over the deck house and would not leave the ship. We decided the only thing to do was to set sail for Tahiti and leave the flies behind. We bade goodbye to Adams and the chief, both of whom had come out in a small boat to give us presents of cocoanuts. Then we headed down-wind.

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At daybreak on the morning of February twenty-fifth the Captain sighted Tahiti and by breakfast time we found ourselves off the harbor of Papeete. From the outer bay we could see the jagged mountain which forms the center of the island, but as we entered the harbor the mountain disappeared behind the foothills and we did not see it until we were offshore again.

Since Papeete is the capital of French Oceania the French inhabitants like to refer to it as the Paris of the South Seas. The town boasts a population of several thousand, a motion picture theatre, numerous stores and several public garages where visitors can hire cars.

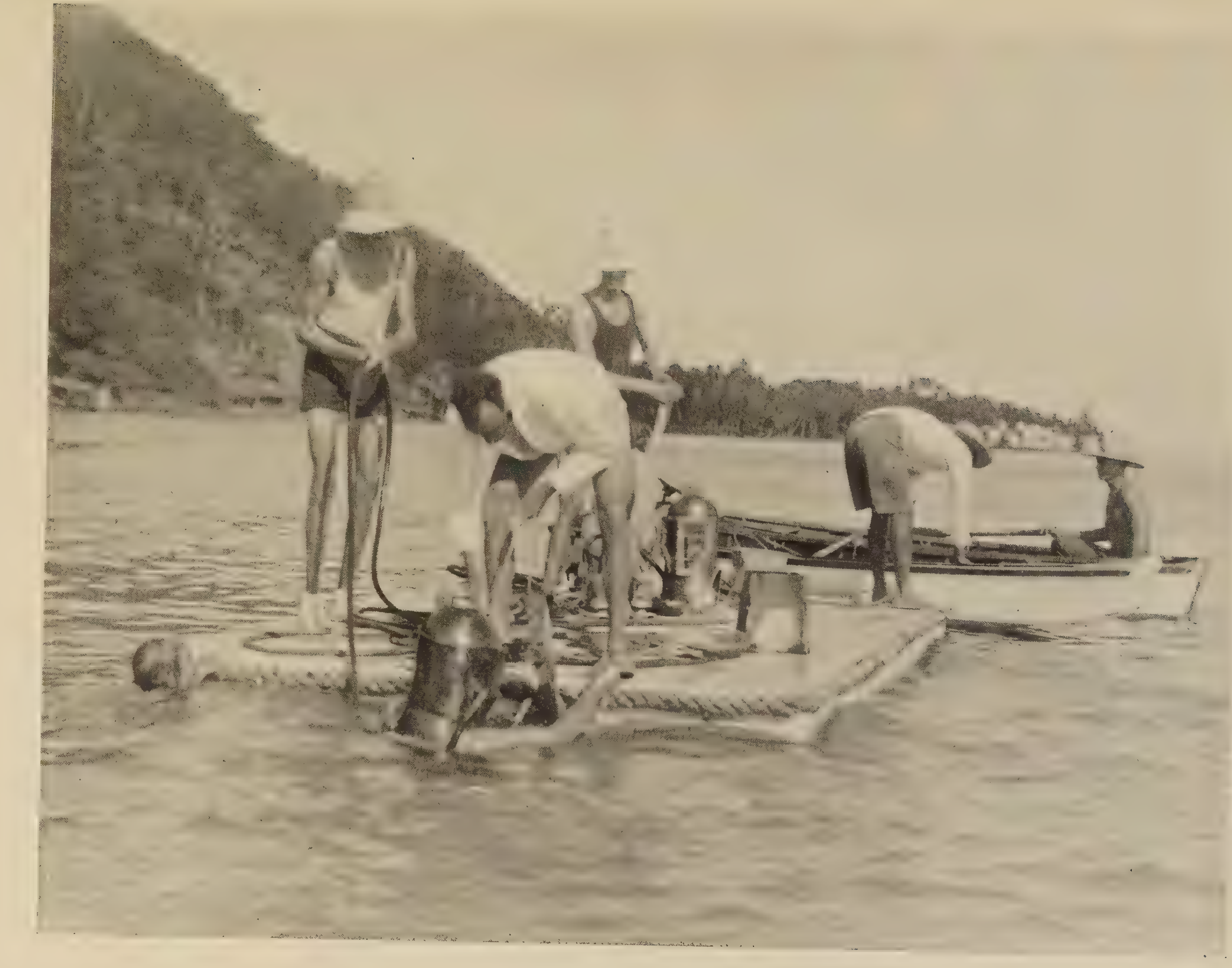
We had letters of introduction to many people living in Papeete or nearby and they were so cordial and friendly that we soon found ourselves entering a whirl of social engagements almost equal to that of Panama. We were taken to the "yacht" club and to the annual horse races. The governor invited us to dinner and the American Consul took us to call on Nordhoff, the author, and on Prof. Harrison Smith. We motored around the island and stopped, among other places, at Zane Grey's camp. One of our major concerns in Papeete was to attend to the shipping of the two Galápagos tortoises back to Field Museum in Chicago. They are evidently ideal travellers, requiring no private quarters, nor food, nor drink during the voyage. They were picketed on the steamer's deck, uncrated, and arrived at their destination in good condition. They are now in the Chicago Zoo and have increased 50 per cent in weight since being installed there.

Mr. and Mrs. Guild, two of the American residents in Tahiti, invited us to use their motorboat and raft for diving purposes. We towed the raft out to the barrier reef and made several descents.

The Guilds had engaged as a tutor for their small girl an ex-Russian cavalry officer who was called for short "Ketch." He watched us dive and soon wanted to try it himself. When we let him go down once or twice in shallow water he seemed to manage the equipment pretty well. He was fascinated with what he saw under water and begged us to leave one helmet with him for a few days, so that he could go down again. We did so, rather unwisely, as later events revealed.

Two days later Ketch appeared on the *Illyria.* He had brought the helmet with him and gave it to the mate, saying at the same time, "Well, here it is, but, for a time, I never thought you would see it again."

Sensing a story, we questioned him. "You remember you



Undersea Work at Tahiti

The tall man on left is the Russian ex-cavalry officer who was caught under water

told me to keep the weights on the helmet and not to tie them on my feet?" he said. "Well, I disobeyed your orders. Little Robinson (who is trying to sail around the world alone in the *Svaap*) and I were diving together. We had anchored the raft in a place where the current was quite swift and the water about 60 feet deep. "Roby" manned the pump while I tried to go down, but as you know, I am 6 feet 8 inches tall and very thin, so I streamed out like a flag, parallel to the bottom.

"I wanted to go down in spite of this difficulty, so I tied a lead weight to each foot to keep me right side up. When I got almost to the bottom the current caught me and carried my feet higher than my head. The helmet filled with water and fell off. There was I standing on the bottom with a lead weight on each foot and no air to breathe."

"The signal line was still tied around my waist, but I knew that little 'Roby' couldn't pull me up in time, all by himself. I tried to untie the weights, but the rope was knotted securely. I felt my breath giving out, and I decided my time had come.

"Then an idea flashed through my brain. I had put an old knife in my bathing suit pocket some days before. I felt for it, and thank God! it was still there. Then I couldn't open the knife. Water was coming into my lungs. Despair gave me extra strength—I forced the blade open and cut the ropes.

"I can't remember any more. 'Roby' says he found me floating on the surface—unconscious. It was a close call all right! But," concluded Ketch very seriously, "I was once in the Czar's Guard. I am too tall to die!"

Another event which occurred about the same time was less dangerous but more amusing. The Guilds had invited us to dinner at their place about twenty miles from Papeete and after dinner they took us to a native motion picture show. The theatre consisted of an old but not unused barn. In fact the chickens and horses were led out just before the show began. Light for the projector was furnished by an automobile battery and motive power came from the arm of the Guild's native chauffeur.

The audience (all native except for us) sat on wooden benches or on the floor and gazed at the screen which consisted merely of a white-washed portion of the barn wall. There were several cracks in the wall through which disconcertingly we could see stars in the middle of the picture.

The chauffeur cranked the projector at about half speed to make the show last longer. The subtitles were in English, but nothing daunted, the chauffeur translated them to the audience —even though he could not read English himself. We gathered from Mrs. Guild that he based his translation on the facial expressions of the actors. At any rate he continued translating even when there were no subtitles.

The high point of the evening came when the heroine—Mary Pickford I think it was—received a letter from her father. She opened the letter, frowned whimsically, and stamped her foot, registering annoyance. The chauffeur used English words for his explanation. "Oh! God damn you poppa!" he mimicked. I am sure Miss Pickford would have been surprised.

Toward the end of our stay we were invited to be the guests of honor at a grand dance which the one local hotel man had arranged for us. He had set aside a special field near Papeete for the dance and had had it wired for electric lights. He

Costume Ball in Tahiti

promised us the greatest entertainment ever produced in the South Seas.

When the great day came nearly the whole population of the island appeared at the scene. Cornelius sat between Governor Bouge and his wife and talked volubly in French. The rest of us also had seats in the middle of the front row. Even Rudi the cook had a place of honor. He had told the hotel man that he was The Visiting Author from the American Yacht.

The entertainment began with a short play, but the plot became weaker and weaker until nothing was left but a hula-hula dance. All the best dancers of the island were there and since the crowd cheered those who shook with the most abandon, their contortions became quite marvelous.

Noticing that the dancers were exceptionally well dressed in colored grass skirts, I asked the hotel man whether that costume was native to the island.

"Well, not exactly," he answered. "The traditional costume of Tahiti is not very interesting to the movie people, so all these clothes were brought down from Hollywood for Ramon Navarro's last picture. Actually the hula dance itself was imported from Hawaii for the movies. We had never heard of it here until a few years ago.

"However," he continued, "I have arranged for one real old-fashioned dance tonight. It is the 'men's dance'—the most complicated and the most interesting of any on the island. The men have been practicing for nearly a week, to be ready to give it tonight. I am sure you will like it."

He was right. We liked the men's dance better than any other we saw in the South Seas. About twenty men, all dressed in real grass skirts, took part in it. They formed in a long line facing each other in groups of two and with hands on hips remained motionless for several seconds. Then the leader gave a terse command. The men first raised their arms and then beat them against their sides like flails. At the same time they broke into a hoarse chant. Then came another command and they revolved their arms like windmills, all in time, and did unusual things with their legs. At a third order they spun around like tops and executed some very intricate steps, still keeping in perfect order and chanting in perfect time. They had somehow mastered the trick of holding absolutely still all the parts of their bodies which were not being used for the action and this resulted in the queer mechanical effect which was so successful in the Chauve Souris. However, the Tahitians were drilled to the point where I think they could have put the famous Wooden Soldiers to shame. It was the only primitive dance I have seen which was really sophisticated enough to be called a finished product.

Governor Bouge and Cornelius became very good friends. It was soon arranged that we should take a trip on the *Illyria* to Moorea, a beautiful island only twenty miles away, with the governor and his wife acting as our guides. Since the trip would require two days, our visitors could sleep on shore with friends.

Moorea is crowned with some of the most fantastic peaks in the world. They tower up from the sea to the height of a mile and end in jagged pinnacles which are almost as sharp as Gothic spires. Many of the peaks have never been climbed and their sides are so sheer that they probably never will be. One mountain is undercut nearly all the way around and looks as if

THE *Illyria* IN COOK'S BAY, MOOREA

it would topple over at any minute. It was tremendously impressive.

We anchored in a narrow mountain-enclosed bay and sent Monsieur and Madame Bouge ashore for the night. The sun sank lower and lower, lengthening the shadows of the mountains and throwing their ragged faces into bold relief. The sky toward the sea was filled with small fleecy clouds which extended far beyond the horizon. Not only the clouds, but even the whole sky became at first pink and then redder and redder until even the calm ocean seemed to be made of fire. Lower and lower dropped the glowing sun until its edge touched the sea, and even the gray mountain sides were momentarily gilded by the glory of its rays. For an instant the world was perfect. Slowly then the sun drowned its bright disc in the sea and there remained, as at the passing of all sublime events, only a sentimental afterglow—a feeble replica of what had been an intense reality.

The fantastic peaks and the glorious sunset are my two outstanding memories of Moorea. They are the things which counted, and I shall not trouble you with the little things which didn't really matter.

We returned to Papeete the next day and made preparations to sail to the Fiji Islands.

The scientists had been impatient at the length of our stay in Tahiti. They had made some casts and paintings of fish, but in general the collecting had not been good. Nature has been more lavish with geographical and vegetable forms than with animals and insects in all the Polynesian islands. Each morning the scientists had gone hopefully ashore with guns and collecting bags, but in the evening they returned in dejection seldom with more than a few small birds and two or three bottles of insects. The specimens they did get were not unusual. Schmidty felt we were wasting time and should push on.

. . . .

It is a long way from Tahiti to Fiji—over two thousand miles—and it took us twelve days to make the trip. We allowed ourselves only one stop—a very short one at Borabora and there we found anchored in the harbor the small sailing yacht *Chance.* On board were three bronzed young athletes from Yale, Dodd, Brown and Marshall by name. They had started from New London on a South Sea cruise nearly nine months before and had sailed all this way with the help of only one navigator and a cook. There had been two more Yale boys on board at the start, who, by the time we met the party had gone on side expeditions of their own. The three remaining boys came aboard the *Illyria* for supper.

Their point of view was quite different from ours. They sailed on no fixed schedule and lingered wherever it pleased them. Sometimes they would go ashore and live with the natives for a week or more. A lazy life appealed to them, but they assured us that they were learning a lot more about the South Seas than were we, with all our scientists and sailors. Who knows? Perhaps they were.

We had planned to stop at Raratonga, where we expected to find mail, but on the day we arrived there the sea was so rough that we could neither go ashore nor anchor to wait for better weather. An English speaking pilot, who came out in a large life boat, warned us against trying to cruise back and

Dynamiting for Fish Specimens

forth offshore in an on-shore wind, and advised us to go on our way. The mail had not yet arrived, but he promised that when it did he would forward it to New Britain. Reluctantly we agreed to change our course for Fiji without having set foot ashore.

Fiji is a surprising island group. Suva, which was our port of arrival, is a fairly large city called by its inhabitants the London of the Pacific. There are many miles of paved streets with curbs and sidewalks. Automobiles are so numerous that a traffic cop is required during business hours at each of the three principal intersections. The natives near Suva are very civilized and their houses are European in aspect. In short, Suva has none of the glamour generally attributed to the South Seas.

The white inhabitants are principally Englishmen and Australians. Unlike the people of Haiti, Panama and Tahiti we found the Suvans to be reserved toward strangers and, with very few exceptions, hardly willing to unbend at all.

While involved in the red tape of a British Colony in the matter of securing permits to land, permits for our firearms, and permits to collect birds, we were much aided by the American Consul and his wife, Mr. and Mrs. Reynolds, and by the Director of Agriculture, Dr. Tothill. Dr. and Mrs. Tothill were old college friends of Schmidty's, and their cordiality was a highlight of our stay at Suva.

When we secured our bird shooting permit we made several hunting expeditions inland from Suva and succeeded in shooting a remarkable species of bat which inhabited a limestone cavern. We also bagged several kinds of wild doves, jays, mynahs, parakeets, etc. Schmidty no longer complained about the collecting.

We decided after a few days to change our location to a wilder place and secured permission to visit Ovalau, a small island more than sixty miles from Suva.

On the way we delayed long enough to make a launch trip up the Rewa River, which runs from the interior of the main island (Viti Levu) to the coast, sixty miles away. We anchored the *Illyria* at the mouth of the river late one evening, and made a start before sunrise the next morning.

As all nine of us went on the Rewa River trip we had to use the outboard motorboat as well as the crew's launch. Murry and I were appointed to run the former. We found it quite a strain to hold onto the vibrating steering handle and at the same time listen to the unmuffled drone of the motor for the twelve solid hours consumed by the trip.

We started off during a tropical shower and it rained more or less steadily all day long. Nevertheless we made good time up the river, for we had engaged a native to show us the channel. Near the coast the adjoining country was flat, marshy and untillable. Further inland were great sugar-cane fields and cocoanut plantations, operated mainly by Indians recently imported from India by the English to do the hard labor. Occasionally we passed slow moving motor-driven canal boats, carrying loads of copra to the sea.

After twenty-five miles the river became narrower and the banks steeper. Instead of orderly cocoanut groves we saw only rank jungle growth and occasional thatched houses. Shortly after lunch time we reached the forty mile point and the current had become so swift that it seemed useless to go further. We went ashore at a small thatched village.

Several women with babies in arms came slowly out to meet us. They were not afraid, but they scarcely knew what to make of our guns and cameras. We reassured them by giving each a silver sixpence. They smiled, but the money did not seem to be of much use to them, for they gave it to the children to play with. The latter were rather afraid of us at first and hid just inside the doorways. We could see their white eyeballs gleaming in the darkness.

There were no men present at the village when we arrived, for they had all gone away to work in their gardens on the hillsides, but just before we left, one tall, husky fellow arrived in great haste. He was dressed in ragged clothes and carried a huge knife in his belt. His hair, which bristled for several inches straight out from his head, made him look like the pictures of Fiji islanders which are sold in the photograph store at Suva.

He rushed up to Cornelius and shook him cordially by the hand, saying at the same time in a deep booming voice, "Hello, George! Good evening, sir. Good evening!"

We were astonished, but as he continued to smile and to repeat the same greeting we concluded that he knew no other English words. In this we were mistaken, for we soon found he had one other sentence at his command. It was, "I worked more one year on steamship Mabalama."

He led us all around the village again and pointed out, among other things, the cook-houses. These were queer little buildings barely large enough to contain a tiny fire, a few pots and pans and a small person. There was one beside each house.

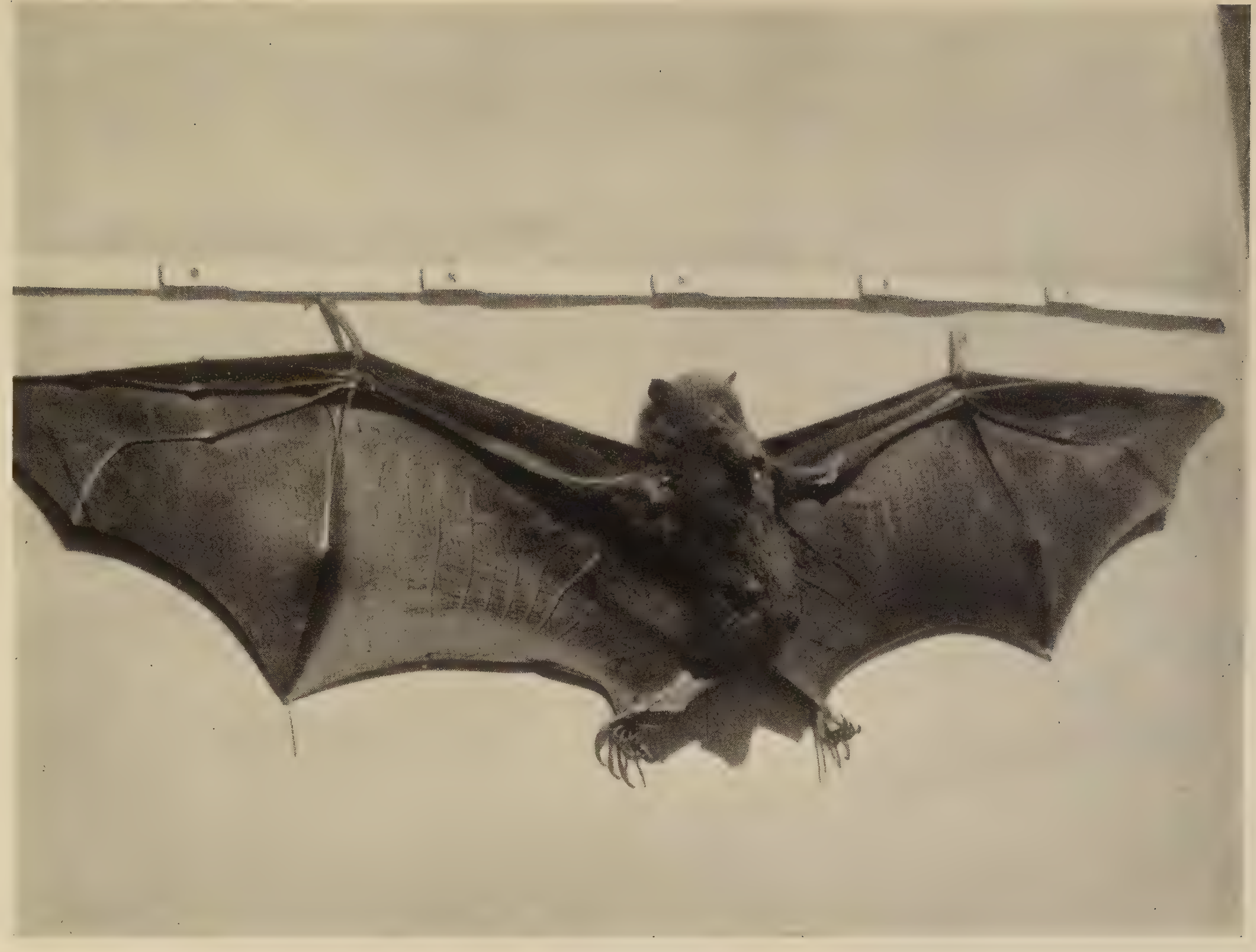
Apparently the justification of the cook houses is that the Fijians must keep their fires under some kind of a shelter during the rainy season, and since they have not invented chimneys the fire must be kept in an outhouse.

The Fijians seem to be happy and healthy, but they are not as industrious as the Indians with whom they now have to compete. Although they are not at present decreasing in numbers, it may be that within a few more generations they will become one of the vanishing races. We felt a little sorry for them, but the booming voice of our six-foot friend was anything but sad as he yelled to us, "Goodbye, George! Goodbye. Give him plenty gas," when we turned back down the river.

At Ovalau, about seventy miles from Suva, we anchored the *Illyria* in a large bay, partially choked with dangerous coral reefs. We had arrived just before dark and in order to watch the tropical sunset had remained on the quarter-deck.

After the sun had fallen below the horizon and just during the period between twilight and dusk, Schmidty suddenly pointed toward the mastheads. Looking up, we saw a host of dim gray flying forms softly silhouetted against the last faint pink of the sunset.

"Flying-foxes!" exulted Schmidty. "Fruit bats! A whole horde of them. I had been hoping we might see some. They are not rare in this part of the world, but they are different on every island—and we must get some for the museum." He told us that these creatures hang upside down on trees during the daytime and sometimes there will be so many on one tree that the branches are broken. At night they make a flight all together, just at dusk, from the roost to their feeding grounds.



THE "FLYING-FOX"

The mammoth fruit bat of the Fiji Islands

"Look!" he cried. "There are thousands of them—big ones!"

They were flying across the bay to the cocoanut plantations where they would spend the night destroying and eating the unripe fruits.

"They are out of range now," said Cornelius. "Will they come back this way?"

Schmidty decided that they would probably return just before sunrise, following the same line of flight.

"Then, if we were in the rigging with our guns in the morning I think we might get some," suggested Cornelius. "What do you say, Sid? Shall we try it?"

The watchman woke us before five o'clock the next morning. We snatched a cup of coffee, buttoned up warmly, for it was a cool morning, and climbed into the rigging with our automatic shotguns. It was very dark, but above the horizon line we could see the dim light of approaching dawn. We found comfortable seats on the yardarms and peered out into the blackness. The wind whistled eerily through the shrouds and we could hear the waves below spanking against the side of the ship.

Slowly came the first flush of dawn. The rigging stood out gray against the pale sky and cut it into little triangles and diamonds. Suddenly I became aware of a weird flitting shape near the bowsprit stays. I aimed carefully to avoid hitting the rigging. "Wham! Wham!" spoke the automatic and the sound was borne off by the wind. The bat hesitated a moment, uttered a horrid scream and then fell over and over until it dropped past the horizon line into the inky blackness below.

We could see nothing, but a faint splash told the story.

"Watchman! Watchman!" we yelled. "A bat in the water off the starboard bow. Pick it up!"

Mr. Cook's answer reached us only faintly, "Yes, Sir! Mr. Crane, sir, Mr. Crane. We'll get him. . . . Hi there! Hi! Man the skiff."

We got three bats in this way, but the rest became alarmed by the shooting and flew so high as to be out of range. The ones we got were remarkable creatures. They were nearly five feet from wing tip to wing tip and the wings were made of delicate membrane. They had long snouts, sharp teeth and pointed ears, like foxes, and their bodies were covered with reddish brown fur. Having tongues and palates, they could scream and make barking noises. "Flying-fox" is a good name, for these mammals really look like small foxes equipped with wings.

We spent two more days at Ovalau, during which Dr. Herre collected a number of unusual fish and the scientists collected several more species of land birds and insects. Except for bats, no mammals of any sort were found. Then we sailed back to Suva to pick up Dr. Moss, who had stayed behind to make anthropological measurements. We had also to put aboard supplies in preparation for our trip to the New Hebrides.

CHAPTER VII

CANNIBALS OF THE NEW HEBRIDES

OUR four day sail to the New Hebrides was not uneventful. To begin with. Duryea H. Jones, an old friend of mine had turned up on the *Niagara* which reached Suva just before we left. Cornelius invited him to join us for a few weeks. He brought us the latest news from home and also a welcome new face to the table.

Then the second cook, who had been shell-shocked during the war, suffered a relapse the day we sailed and had to spend a week in his berth. His absence meant longer working hours for the other cook and since the ship was rolling badly and the temperature in the galley ranged from 120° to 125° the latter's efforts were somewhat handicapped. During the breakfast hour on the third day we heard a queer noise in the galley and running in found poor Rudi as white as a sheet, unconscious on the floor. We lifted him into the saloon but in spite of every effort it was several hours before he became conscious and then he suffered from convulsive paroxysms.

Later on the same day the crew's mess boy spilled a kettleful of boiling tea on his bare feet and scalded himself very badly. As a result Bill Dwyer the steward had to fill the places of all three men until they recovered, luckily only a few days later.

The New Hebrides group consists of a large number of small, very mountainous islands. They were discovered in 1606 by a Spanish navigator, but little notice was taken of them until Captain Cook paid a visit in 1773. Subsequent European colonization has been very slow. At the beginning of the present century these islands were a sort of no-man's land held partly by British and French planters and partly by some 70,000 natives. To avoid dispute a joint protectorate was formed and now English and French settlers have equal rights.

Shorthanded as we were, it was a relief to reach Vila, the largest port in the New Hebrides, on March 27th. The town itself was a great disappointment to those of us who had not prepared by reading about it in the *Encyclopedia Britannica.* I had a mental picture, gleaned from popular books of a tiny place set on the edge of the jungle and environed by cannibal villages. Instead I saw a full-sized town composed of docks, streets and red-roofed houses with automobiles parked in front of them. There was not a single cannibal to be seen and even friendly natives were absent for they have been displaced by the Indonese laborers imported by the French. Dignified Englishmen strolled about, canes in hand or sipped cooling

Coral Forests

drinks on spacious verandahs. Nothing could have been further from the popular idea of a cannibal isle than Vila.

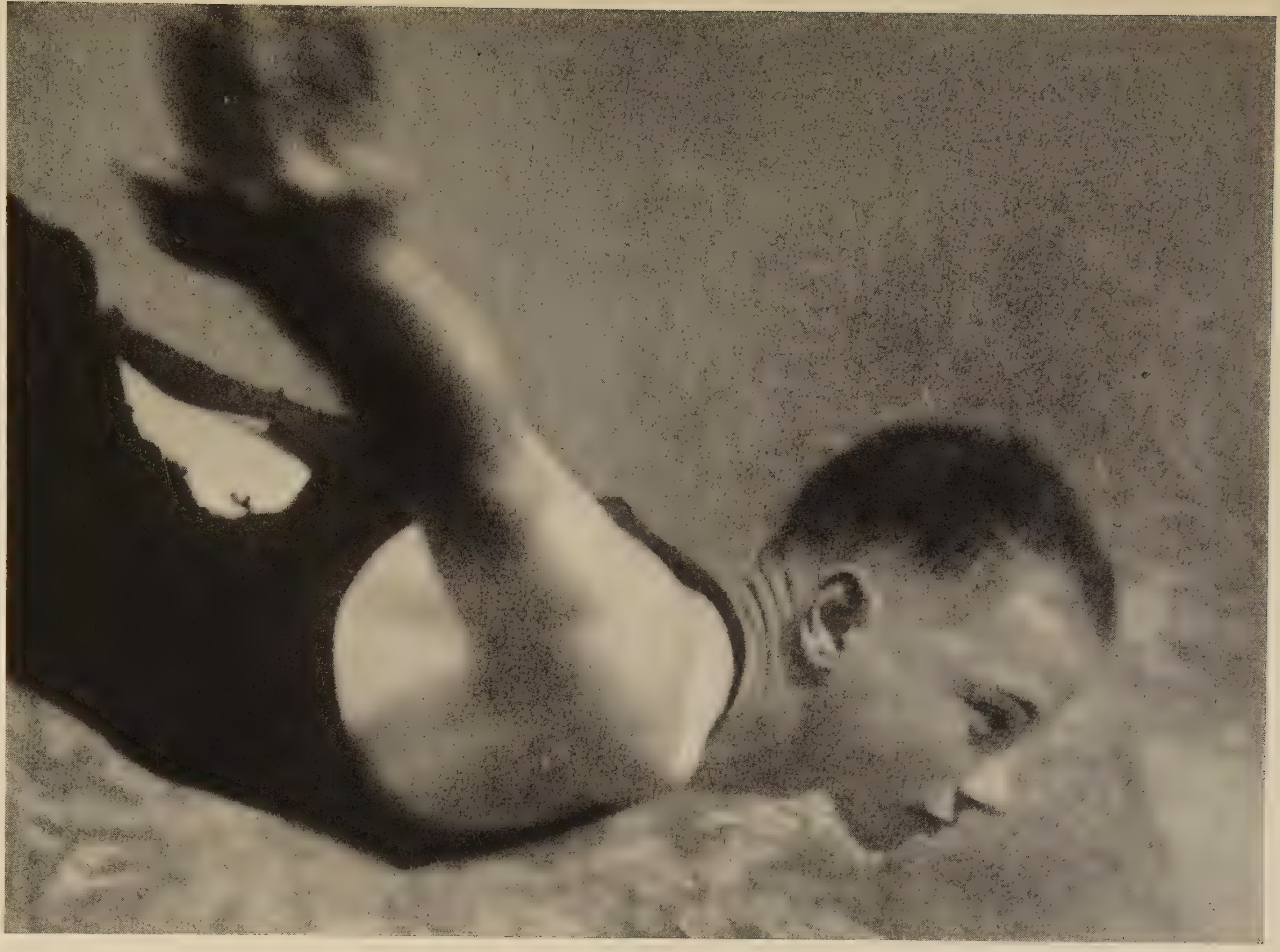
We soon abandoned our hope of finding romance on shore. However, on the floor of the harbor we met with better success. Descending in about six fathoms of water with our diving helmet we found the visibility to be very good and spent the whole afternoon taking turns at exploring the corals on the bottom or photographing them with our under-water camera. The range of brilliant colors was very fine and the coral formations were of fantastic shapes. Hundreds of little fish wandered through them, darting away at a sudden movement on our part. Now and again a whole school would pass, maneuvering in as perfect a formation as a flock of starlings. When at the same instant they all turned the sunlight would be momentarily reflected from their silver bellies as if a battery of little lights had been flashed. But when viewed from slightly above, some of these schools were almost invisible even in motion, so effective was their protective coloring.

Other fish which were carefully shaped and colored to appear like coral growths could hardly be seen except when in motion. Instead of slipping away if alarmed by our approach they would swim for a short distance and then stop so suddenly and in such a strategic position that their identity became lost—just one more twinkling blurr of light and shade in a background of colored spots, all sparkling in the sunbeams refracted from the wavelets at the surface.

There is infinite variety in the corals. Some rise in thick coarse branches from the sandy bottom like ghostly bushes which, decapitated and bleached, have long been dead. Some formations are rounded and soft like giant foot-stools while others are angular, brittle and cruelly pointed. Still other fronds are intricate and delicate in their branchings and infinitely varied in their pastel colorings. The ocean floor might be compared to a flower garden in full bloom though the latter would suffer by the comparison since, seen through the green-blue medium of sea water, the colors of the undersea world although bright, are never glaring nor unharmonious. Both color and form are more complex, more exotically luxuriant and more vaguely mysterious than in the world above.

The gentle winds which sway the flowers of the upper world have also their marine counterparts for the ceaseless surging of the ocean swell imparts a sweeping motion to the seaweed and other flexible growths on the bottom and to the minute animal and vegetable particles suspended in the water. The motion is slow, dignified and almost monotonously regular. Everything sways at the same instant and moves the same distance. Yet there is something awe-inspiring in this incessant surge of the depths—this pulse of the sea. It began when the earth was young and it will continue just as slowly, just as irresistibly until the sea is no more.

A man with a diving helmet could spend days, even weeks on a fifty foot square of coral reef and yet find something new and interesting every hour. Nevertheless most of the white inhabitants of the tropics are satisfied to peer through a water-glass once in a great while and would not dream of diving even in places where there are no sharks. They excuse themselves with talk of poisonous corals, of deadly jellyfish, of spined sea-urchins and of molluscs which might snap shut on their ankles. As a matter of fact these dangers are mostly mere superstitions and with a little care diving is as safe as



Murry Fairbank Diving Among the Coral Fronds

Photograph taken at a depth of three fathoms

playing golf. To explore the ocean floor is to add a new world to your experience.

Acting on advice from the officials at Vila we sailed that same evening for Bushman's Bay on Malekula Island to seek information regarding bird-collecting and native life from Mr. Adam, the District Officer. Arriving at the Bay the next morning we were again discouraged by the civilized aspect of the landscape. Several neat white houses and sheds stood under orderly rows of cocoanut palms and a Ford truck loaded with cocoanuts chugged in the foreground.

We went ashore and on inquiring for Mr. Adam, were told that he was away but that his wife would see us. Mrs. Adam, a kind hearted and pleasant Australian, could give us little information on the subjects in which we were interested but advised us to go to the island of Malo where we could find her husband and she added the excellent suggestion that if we stopped at Wala on the way we might find it interesting.

Early the next morning the *Illyria* anchored in protected water off the small island of Wala and we arose to begin a day which turned out to be one of the most eventful of the whole trip. A glance at the shore was most encouraging, for instead of palm trees and tin roofs we saw a dense jungle almost crowding the white beach into the sea. Only a few low, thatched huts were hidden in the undergrowth. Better still, the beach was lined with outrigger canoes which had been drawn up above the high-tide level and already dark-skinned figures could be seen dragging some of them to the water.

Soon the *Illyria* was surrounded by friendly natives who paddled around and around her apparently very curious about this strange ship and its occupants. We were as much interested in their boats as they were in ours, for each canoe had a carved figure-head. Most of the figures were grotesque birds but a few other animals were represented. We also noticed the ingenious way in which the outriggers were joined.

Some of the natives could speak a little "bêche-la-mar," the South Sea equivalent for pidgin English, and of this we were soon given a sample. A man of more intelligent appearance than the rest looked up at me and asked, "Sip (ship) belong Vila?"

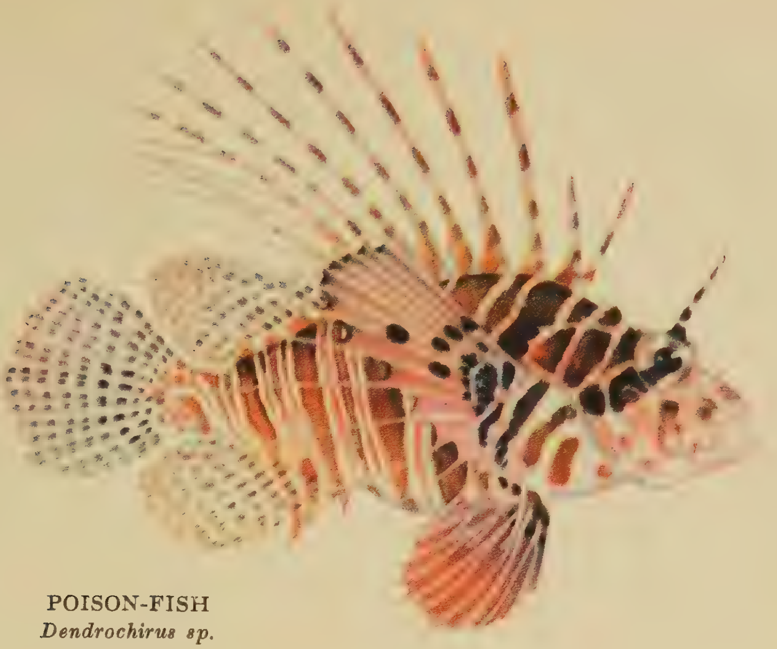
Having studied a treatise on pidgin English I was able to answer, "Sip he no belong Vila. Belong America!"

"Melica he stop long way?"

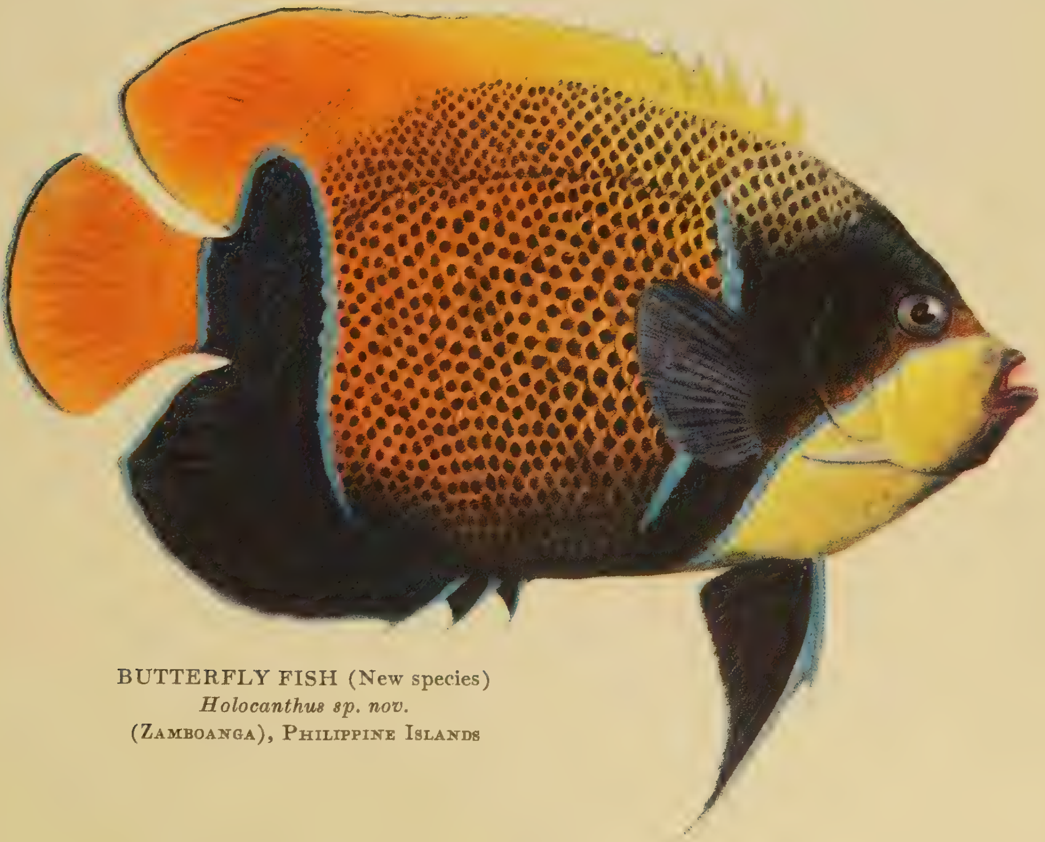
"Long, long way too much," I explained, "more long way Vila."

The native frowned thoughtfully for some time, apparently at the novel idea that anything could be further away than Vila. Then he smiled. "Vila more better," he said and paddled away in triumph.

Shortly afterward we went ashore in our small boat and scores of natives who came running at the unusual sound of our outboard motor helped us get our equipment ashore. But this feat once accomplished they became shy and constrained in their manner. A few women who had been lurking at the outskirts of the gathering took to their canoes and throwing some old rags over their heads and shoulders paddled away as fast as they could. Some small boys retreated to the jungle and three old men, naked, unless white hair and beards can be called clothing, glanced at us in hostile fashion and each produced from one of the beached canoes an old Snyder rifle loaded with antiquated but still dangerous cartridges.



POISON-FISH
Dendrochirus sp.
Waigiou Island



BUTTERFLY FISH (New species)
Holocanthus sp. nov.
(Zamboanga), Philippine Islands

The young men, however, continued to be friendly and invited us to visit the "place belong dance." As we were considering this offer a Catholic priest came walking along the beach. We were surprised to find him there, but he explained in French that he had been visiting a neighboring island and having seen our ship had paddled over to make a call. He said that the natives were very friendly except those of the generation of the three old men with the rifles. Their generation has never recovered from the bloody customs of cannibal days and such fierce feuds are still maintained between the different groups that they seldom dare to venture abroad without their weapons.

The natives of Wala once lived across the strait on the mainland of Malekula but the hostility of the bushmen from the interior forced them to take to their canoes and seek safety on the island. Since no bushman dares to enter a canoe the inhabitants of Wala are safe from attack at home. However, the women must go across the strait into the danger zone every day in order to work in the gardens which are still maintained in the ancient clearings on the mainland. An armed escort always accompanies the women and thus a desultory guerilla warfare is carried on from year to year.

The Catholic Father explained that we need not be apprehensive as no white man has been molested on Wala for years. The old women whom we had seen depart in such a hurry were late for their work in the vegetable gardens and the armed men were their escort. He offered to show us the dance grounds himself.

We followed a tunnel-like trail into the jungle for some little distance to a small village set in a clearing. It consisted of about thirty thatched houses, long and very low with steeply pitched roofs. Each house was enclosed by a low bamboo fence and a higher and stronger fence encircled the whole village. The purpose of the outside fence is to keep away the wild pigs which inhabit the forest and the inner barriers are for the segregation of small pigs and poultry—the wealth of each family. So important are the latter in the economic scheme that they are allowed to sleep indoors with the owners. To add to the confusion each house has a fireplace but no chimney. A variation of the old riddle would be: kids, pigs, smoke and wives, how many are likely to survive?

Imagine yourself tramping along an ancient trail through a dense tropical foliage so thick that there is only a half light. The quiet of the forest is unbroken by any sound from your barefooted guides but occasionally you hear a few sweet, liquid notes from the throat of an unseen bird that might well be a woodland spirit. On rounding a bend in the trail you look past the buttressed, creeper shrouded tree trunks in the foreground, into an immense natural cathedral. Its sides consist of the trunks of trees and its arched roof is symmetrically formed more than a hundred feet above you by their lower branches. At the further end is a gigantic cylinder of twisted roots and snarled vines—the trunk of a banyan tree. The many strands join into a single great bole some sixty feet above the ground and at a still greater height the branches spread out into an enormous canopy. From each branch hang vines and tendrils, like stalactites from the roof of a cave. The sheer beauty, the weird luxuriance, the sense of mysticism of the "devil-devil" glades of Wala exceeded anything we found in all the Pacific islands.

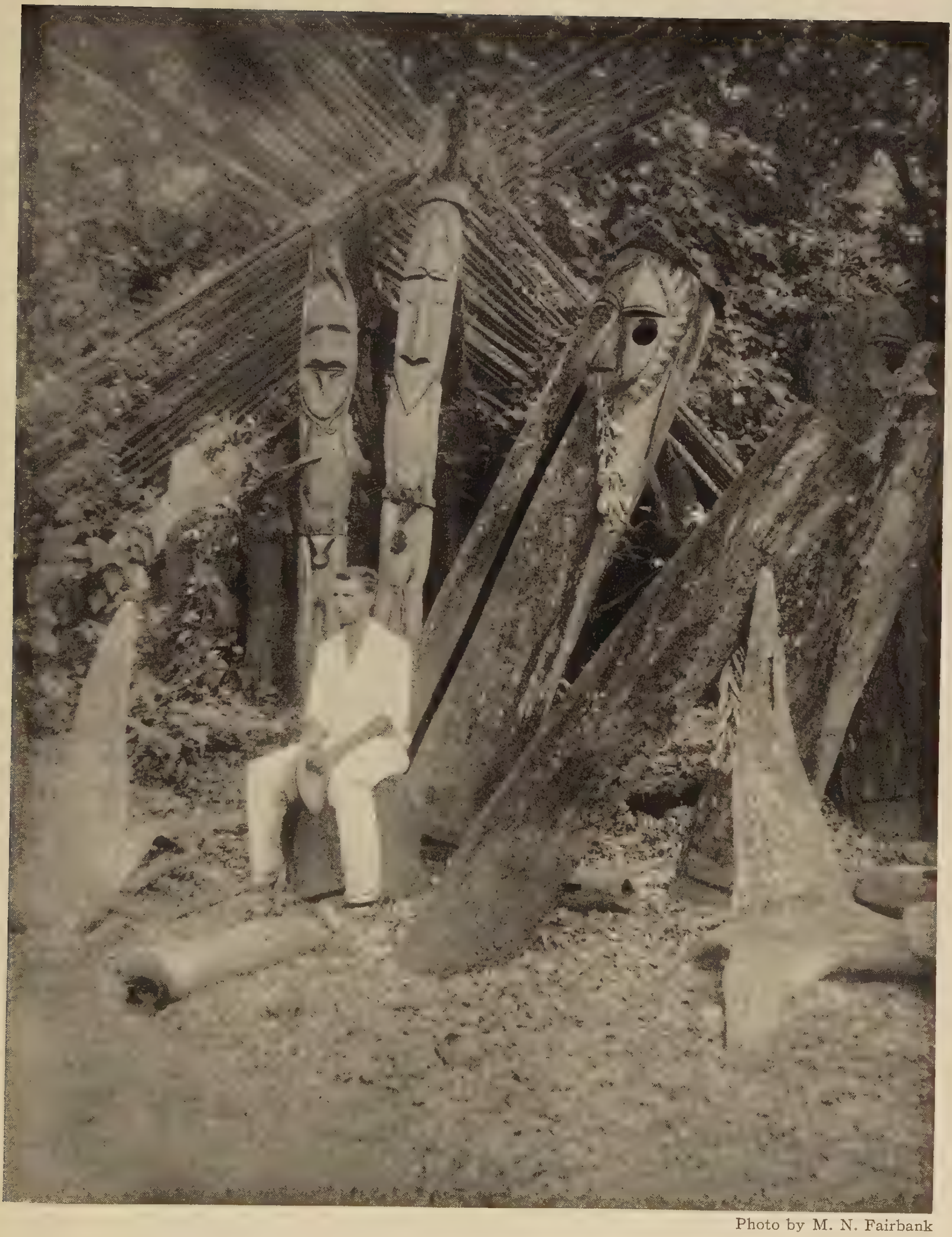


Photo by M. N. Fairbank

Among the Leering Images in the "Devil-devil" Glade at Wala

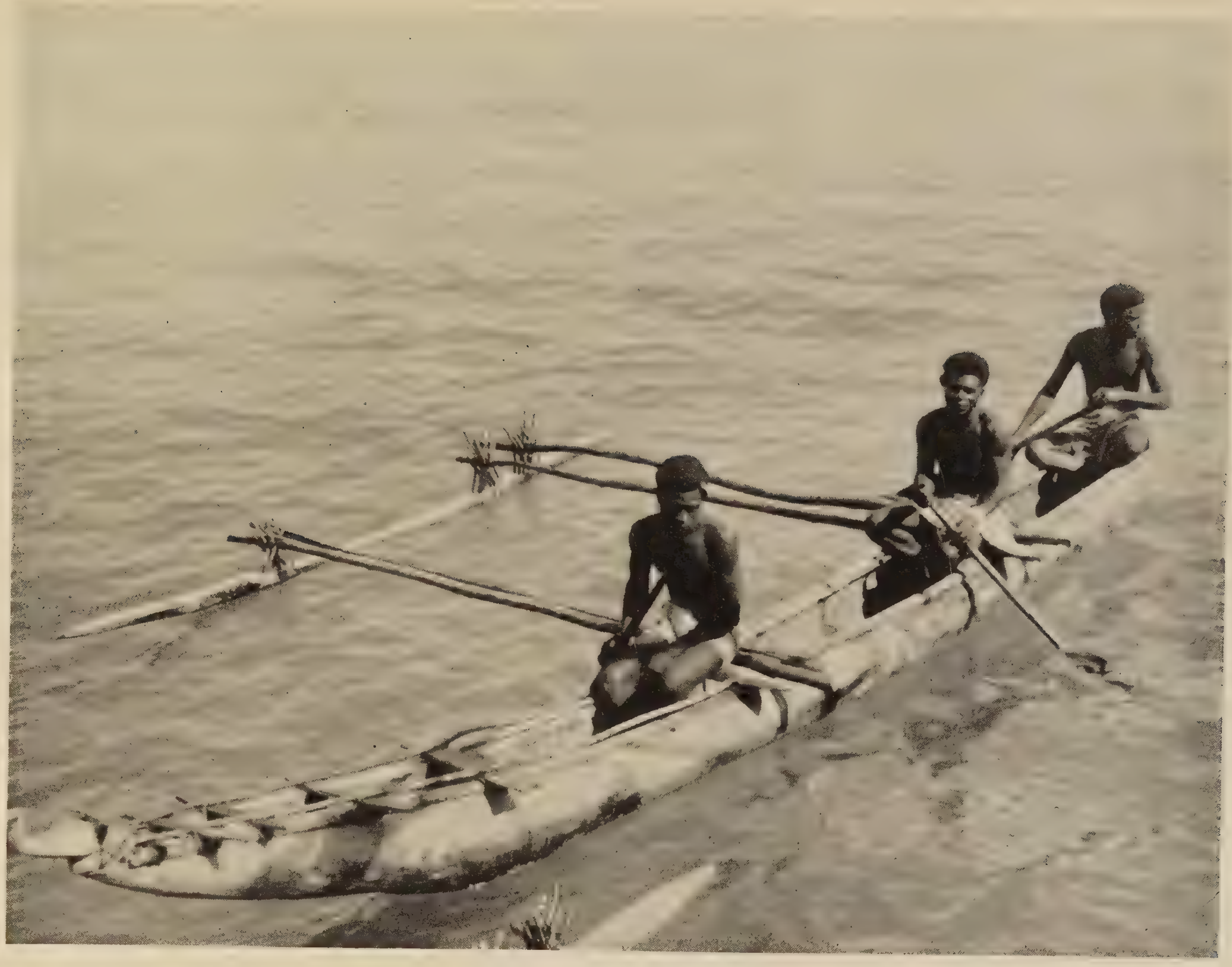
This marvelous setting occupies at first only the margin of your attention for something even more striking has caught your eye. Under the banyan tree are a multitude of grotesque tubular wooden forms with carved caricatures of faces, hollow eyes and long gray bodies—the devil-devils. They rise from the ground like toadstools, leaning at the crazy angles of futuristic skyscrapers. Of different heights and diameters they possess boundless individuality.

Some of these leering wooden giants are drums. They are made from a section of tree trunk partially hollowed out through a long slit in the front. When one is beaten with the fist it gives off a low note which echoes and reverberates through the aisles of the forest. If beaten harder with a stick the sound can be heard for miles, so the natives make use of the drums for signalling as well as for dance music. Many of the faces which have been so carefully carved have queer, human expressions, some of them positively humorous. They might be a gathering of hoary mountaineers.

There is a second wonder in these glades, less striking but equally interesting—the temple of the sacred pigs' tusks. Strange as it may seem the humble pig is not only the medium of exchange and a main source of meat supply in the New Hebrides but also an object of high religious significance. At an early age the two front teeth on the upper jaw of each pig are knocked out. The corresponding teeth on the lower jaw are then free to grow into tusks and by the end of seven years, barring accidents, one complete whorl of a spiral will have been formed. A pig thus adorned is equal in value to one old woman or £7. However, growth does not stop at this point for the tusk continues on its way passing through the bone of the upper jaw and out again so that in another seven years it has made another revolution. The value of the pig is then at least £20, or it may be exchanged for a reasonably attractive wife. If the pig lives long enough to grow a part of a third concentric ring he becomes very valuable indeed and the owner will not part with him at any price.

However, the careers of most pigs end at the religious festivals where they are brought by their owners as offerings. The death of a pig is considered a great occasion. The lucky man who is to perform the execution arms himself with a beautifully-carved, ceremonial pig-knocker and after due formalities and incantations he firmly seizes the sacrificial offering in spite of any squeals or struggles that it may offer and kills it with one blow. The most important man in the village is he who has killed the most pigs, and the man who has ended the life of a pig with hermaphrodite characteristics enjoys a very special distinction. The upper part of the skulls with the tusks attached are carefully saved and for them a special shrine is built in the devil-devil glade. Here the skulls are placed in rows on long benches with the tusks in prominent positions. The effect is both unusual and ornamental. We saw several of the ivory spirals which had nearly completed the third whorl.

That evening we tried an experiment to which we had long looked forward. We gave the natives their first motion picture show. A screen was fastened on the boat-boom at right angles to the side of the ship and the electrically operated projector was placed on the gangway. By this arrangement we could see the screen from the deck, while our audience also had a good view from their canoes in the water. They had prom-



Men of Wala, New Hebrides

The outriggers make these narrow craft seaworthy

ised "to come along sip when sun he go finish," but for half an hour after dark we saw not a sign of one. Finally the Captain gave a few blasts on his whistle and within five minutes our audience arrived. There were about thirty-five canoes from different islands, each loaded with men, women and children, and as the title of the picture flashed onto the screen they gasped with amazement.

The first scene, which showed an African native beating a drum, met with great approval. Then an audible murmur went over the audience as a group of natives was shown and when these began a war dance the excitement was terrific; our spectators gave vent to excited war whoops and made stabbing motions with their paddles. The excitement changed to disapprobation when a white man was seen in charge of the Africans. An aeroplane was viewed with complete indifference, but an automobile was considered highly amusing.

I deduced from these and other reactions that the natives had the ability to see and appreciate only the simpler things which were going on. Of course they could not understand the story at all but they were not surprised at the closeups and they seemed to grasp any representation of objects with which they were familiar. This was especially interesting because the reactions of the natives of New Guinea were in exact contrast when later they saw the same picture. They showed no interest in the automobile but were very excited by the aeroplane (perhaps because one had flown over them at some time.) They were bored with the African natives but burst into roars of laughter at a close-up of the heroine.

At one point the audience was nearly stampeded. Schmidty took a flashlight picture of them from the bridge, just above the screen, and by a queer coincidence he exploded the powder at exactly the same instant a man on the screen aimed a rifle at the audience. The brilliant flash momentarily blinded everyone and no doubt our audience thought they had been shot and killed for they were paralyzed with fright and did not utter a sound. Then, finding that everything was continuing as before, they concluded it was "something belong white man" and roared with laughter.

They watched five reels with close attention and at the close of the performance thanked us with an assortment of bloodcurdling war whoops.

After the picture show we went to the island of Rano about two miles away to see a dance for which Cornelius had arranged earlier in the day. We were met on the beach by a handful of natives who led us burdened with our heavy motion picture camera, flares, lights and other equipment for half a mile into the woods. Presently we came to a "devil-devil" glade and with our flashlights spotted the customary banyan tree and ten devil-devils. Our guides made motions from which we judged we had reached the place of the dance but as no natives could be seen we sat down and waited. As long as we kept our lights lit, nothing happened, but when Cornelius ordered the lights out three rascally old men materialized out of the forest and took places beside the devil-devils.

We retired to a corner of the glade and waited in darkness complete except for the light of an old kerosene lantern. A new moon cast a few pale rays through the canopy of leaves above but no stray beam could relieve such all-pervading gloom. Although we could neither hear nor see anything we could smell and sense the jungle all about us. I felt as if I were in a haunted house and half expected to hear the devil-devils whispering to each other.

As if to fulfill my expectations a low rhythmical drumming reached our ears—apparently from the direction of the devil-devils—soft at first but increasing in volume. Then a faint weird sound of many human voices could be heard repeating in unison a few eerie notes. Cornelius said it sounded like the ancient Gregorian chant of the Roman Catholic Church. The sound, plainly at a great distance—almost as if in another world—grew louder and louder and then died away. After a short silence the drumming began again and as before the singing followed—but this time the singers had evidently come nearer. Again and again this performance was repeated and each time the singers closed in. When they had reached a point we judged not far away there came a sudden change in the technique. The gentle drumming and eerie singing was given as before but when we expected it to die away there came instead a series of hair-raising screams, not a hundred feet distant. The din was truly terrifying, and I had to remind myself that everything was all right and that I was not about to be scalped or even sacrificed with a pig-knocker.

The climax of the evening had been reached for afterward there was only a repetition of the same drumming, singing and war whoops until finally it became very monotonous. When we turned on our lights to find who had been responsible for such a remarkable vocal output we saw a queer assortment of boys, young men and old men, about thirty in all. Although they sang in unison, their movements were anything but rhythmic. Apparently the population of Rano has become so depleted of late years that it is necessary to impress the entire male population for the chorus and, unlike small children, they are better heard than seen.

When the dance was over we attempted to reward our hosts by presenting them with bead necklaces which we had selected long before at the ten-cent store at home. One more of our illusions of the South Seas was disrupted when the natives disdainfully refused the beads.

"He no good," growled the chief. "Me no like. Me want him feller whickey (whiskey). White master gammon along me too much altogether."

The dancers were so angry when they found we had brought none of their favorite beverage that if we had been a smaller party or if the event had occurred a score of years ago, I believe they would have attempted a reprisal. As it was such hostile looks were directed at us that we made a quick return to the beach and pushed off at once in our boats.

We reached the *Illyria* about midnight and went quickly to bed after a long day. Everyone had done more work than on any day since we went cattle hunting in the Marquesas. Walt had made several sketches and Schmidty had found four or five unusual lizards. For my part I had exposed in one day 830 feet of film and sixty still pictures as well as projecting the five-reel "thriller."

The following day we anchored off the island of Malo in the strait between that island and Espiritu Santo. On the shore was a large cocoanut plantation belonging to Mr. Wells, a hospitable and well educated Australian planter. Luckily for us, Mr. Adam, the District Officer for whom we were looking, was visiting Wells. He received us cordially and we all gathered around some glasses of good beer to discuss plans for finding collecting grounds and some really primitive natives. Wells said he could take us into the bush behind his plantation to see some of the more friendly bush natives.

Adam was less encouraging. "So you want to visit the Big Nambas tribe?" he said. "They're still cannibals and we can't trust them to behave. Perhaps you are willing to take the chance. I'm not. So I can't give you permission."

His reason was that if we should get killed by the Big Nambas he would have to send to Australia for a battleship to punish the culprits. This very thing has happened several times and each time the blame for the heavy expenses incurred by the battleship has fallen upon the head of the local District Officer. We tried to convince Adam that we were not anxious to commit suicide. He promised to think the matter over.

After lunch we went with Wells in search of bush natives. He explained that although he had thirty "boys" working for him on his plantation they all came from other islands. The bush natives of his own island are so shy and so anxious to avoid contact with the whites that they will not work on the cocoanut plantations at any price. Once in a great while they come down to his store to do a bit of trading for they live only a few miles inland but in general he does not see them from one year's end till the next.

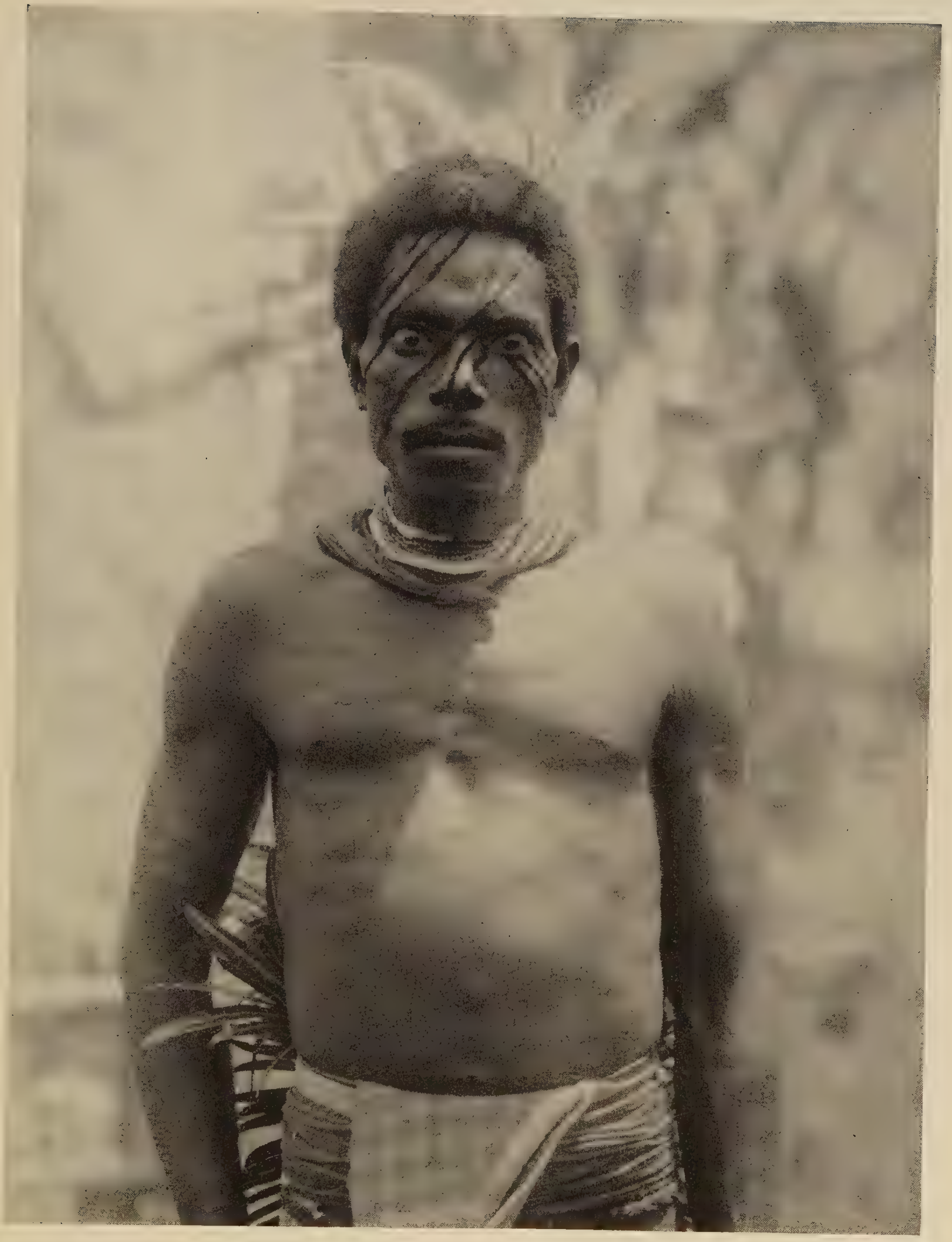
We followed a road which led straight back into the cocoanut grove for about a third of a mile. Then came a steep ascent of about 200 feet and then a plateau with another palm grove on it. Behind, was another gigantic step and another plateau which Wells was clearing, still further to enlarge his plantation. He has been fighting the jungle for over twenty years, ever since he came here all alone, a boy of seventeen. With a small group of native helpers he cleared all the land and planted every nut-bearing tree now standing on the property. At thirty-seven years of age he has one of the finest plantations in the New Hebrides but he has paid for it by twenty years of hard labor and a solitary life. His health has begun to suffer. He says he is "tired of the whole show and would chuck it in a minute" if he got the chance.

Back of the newly cleared land on the second plateau the path led into the dense jungle. Aerial rootlets, vines, creepers and fallen trees did their best to impede our progress and in places our trail was little more than a tunnel often so low that we had to crouch. To make matters worse Wells warned us that since many of the overhanging plants were poisonous we should do well not to touch them.

After what seemed to us a tremendous journey but which was only a mile and a half according to Wells, we emerged in a little clearing containing two small straw huts. On our approach we had caught a glimpse of dark figures dashing away and Wells had to go in search of the fugitives. As he is both known and trusted by the bushmen he was able to persuade them to return.

There were two men, two women and a little girl. The little girl wore no clothes, the women very few, and the men not much more. The men were intelligent though rather savage in appearance, but the women seemed gentle and almost pretty.

Among the bushmen, as elsewhere in the New Hebrides



A Bushman of Malo Who Visited Wells' Plantation in Full Regalia

the women must do most of the work while the men get all the glory. On Malo the bushmen do not live in villages, for each family prefers to have its own clearing. They plant a few cocoanut palms, raise some pigs and poultry and each woman must tend a garden in which grow yams, vanilla bushes, papaya and breadfruit trees. These people use shell money and live pigs as the medium of exchange and the only form of art in which they are versed is basketry.

We dove once more into the jungle and had walked almost a mile in the direction of another clearing when we met a remarkable party of three. We had just come around a sharp bend in the trail when we saw in front of us two men and a little girl, standing as rigid as statues. They had been carrying home yams and breadfruit from their garden and the sudden approach of so many white men had visibly startled them.

The man leading the party was a "big feller master" or chief. He was barefooted, but wore anklets of blue and white cowrie beads in many strands. Around his waist was a wooden belt about six inches wide from which, before and behind, hung ferns. To the belt were also fastened two leather cartridge pouches, a knife, a long machette, and a half cocoanut shell. Around his neck and around each wrist were wound many more strands of the cowrie bead-money and his biceps were constricted by tight bands of the same material. On top of his head leaves were arranged in a neat radial fashion from a common center and a black stripe about six inches wide ran diagonally across his face from hair to neck. The finishing touch to this remarkable "get up" was a short pipe tied to the back of his neck—apparently the most out-of-the-way place he could think of to keep it between smokes.

The other man was similarly though less ornamentally dressed, but the little girl wore nothing at all. Although only about five years old, she was already doing more than her share of the work, for she, like the others carried a stick over her shoulder with a bundle suspended from each end. Although her burden was small in proportion to those of her companions, it was nevertheless a heavy one. I fear that child labor laws would be unpopular in the New Hebrides.

Wells hit upon the happy plan of inviting all the bushmen and their wives to come down to his plantation the next morning so that we could photograph them with our heavy, more efficient cameras. At first the chief did not seem very enthusiastic about this plan, but by good luck I happened to have a cheap bracelet in my pocket and when this was presented to him and an offer made of a similar gift to every one who could come to the plantation he smiled and gave in. In fact he promised to bring not only several "big feller masters all same along me," but also "marys belong masters."

When we asked him what time he would come he pointed into the air at an angle of about forty degrees with the horizon and said, "Sun he stop."

"Good," said Wells, "that means eight o'clock. I expect there will be more bushmen at the plantation tomorrow than I have ever seen there at one time."

On the way back to the plantation one of our party inadvertently touched a stinging nettle. Within half an hour his hand began to swell and became very painful. As soon as we reached his house Wells treated the hand with ammonia. The pain at once decreased and the swelling soon disappeared. This incident reminded Wells of an event which occurred twenty years before, when he had first come from Australia and was the only white man on the island.

"I was just a kid then," he said. "I had never heard of these rotten nettles. One day, when I was helping the natives clear the land, I unwittingly chopped down a nettle bush.

"There was hell to pay. Within an hour my hands, face and whole body became terribly swollen. My skin formed into such tremendous blisters that I could neither see nor open my mouth. Yet I didn't know what had made me sick.

"I hung between life and death for three weeks, and was delirious most of the time. Several of the 'boys' were faithful—they gave me water and a little food. Then a trading schooner came to my harbor, and by purest chance a young medical student happened to be aboard. He brought me out of my terrible plight by bathing me with ordinary ammonia."

Dangers like this are among the hazards that the lone planter or trader must face in this unhealthy spot.

Aside from sickness there is always trouble with the natives to be feared. Three of Wells' neighbors had come by boat to find what the *Illyria* was doing and after a few rounds of whiskey and soda they matched each other in telling stories. Wells told of the days when a small schooner came drifting toward his plantation with sails flapping in the wind and no one at the helm. He rowed out and boarded her. He found the decks wet with blood and the owner and crew lying dead and mutilated—stripped of the most edible portions of their flesh! This was the outcome of an unsuccessful recruiting expedition to a neighboring island.

Such stories, following in rapid succession, held us spellbound. These men spoke casually of women buried alive, of mothers sold into slavery by their sons, of friends killed by sharks and mutilated by crocodiles, of unexplained murders, of deaths by torture, and of ferocious cannibalism. These things they must face for two or three months each year when they go on their recruiting expeditions.

Recruiting is one of the big problems of the British planters in the New Hebrides. The French are allowed to import Indonese laborers, but the English are required by their laws to find plantation hands within their own islands.

The difficulty lies in the fact that the natives are able to live perfectly happy lives without working at all. Hence, the plantation owners must offer them very attractive bait to make them "sign on" for work. The only alternative is to kidnap laborers.

Kidnapping has been so prevalent in the past that the wilder natives have become wary of recruiters and often fire upon boats which approach their harbors. At other times they ambush white men who dare to land on the beaches.

Certain planters who have built up reputations for honesty and square dealing with the natives have come to be trusted and respected. When they go recruiting they give away valuable presents to the chiefs. They pay well the "boys" who work for them and they return the boys to their homes when the working period (1 to 3 years) is over.

These honorable planters are usually successful in the long run. Nevertheless, even they take a certain risk when recruiting, for if some dishonest planter has recently kidnapped a native, his friends are apt to fire upon the next white man who approaches, whether he has a good reputation or not. Hence landings on strange islands are always made with two boats.

One stays off shore with a crew of riflemen and covers the landing of the other. The landing party does not leave the beach for fear of ambush in the jungle. All business is transacted at the water's edge.

"But, accidents do happen," said Adam. "Two planters were killed and eaten last year. They had been careless. That's why I don't want you fellows to take any chances."

"Still, there is one place I might take you," he continued slowly. "It's an inland village of the Big Nambas tribe on Malekula Island. The natives there have recently shown signs of friendliness. They have allowed one missionary, Nicholson, to visit their village. He went only once, and was undoubtedly the first white man who has ever been there, but if we can get him to go with us I think we shall be safe. So if you are willing to fool around for two or three days while I get Nicholson, I will not only give you permission to go, but I will go along with you.

This was too good an offer to refuse, even though it meant another week lost on our schedule. It was decided that Cornelius, Dr. Moss, Murry and Chuck should be the lucky ones to go inland. Schmidty, Walt and Frank elected to be left at Hog Harbor, fifty miles away, to collect specimens while the Big Nambas expedition was under way.

We still had our date to keep with the bushmen, so we remained at Well's plantation overnight.

I had been very much impressed by the way in which Wells had told what time the natives would come by the angle at which the chief pointed into the sky. Now I began to lose faith in the method. The bushmen were supposed to come at eight in the morning, but it was not until eleven that the first one appeared.

After "plenty long time too much" seven more men straggled out of the underbrush. They were dressed in shells, bead money and ferns, and their faces were elaborately painted.

They understood nothing about the camera, but they regarded being photographed as a great honor. When we posed one man alone the others were so jealous that we could hardly keep them from crowding into the picture.

With the motion picture camera the difficulties were even greater. It seems that because they were chiefs four of the men felt entitled to stand directly in front of the other four at all times. We managed to get them to dance around in a circle, but the instant I began to grind the camera the four chiefs would stop and stand in a line in front of the others who, although they kept on dancing, could no longer be seen. Once one of the chiefs tried to stand in front of the other three, but they roughly pulled him back into line. Matters of etiquette are not taken lightly in the New Hebrides.

We were about to give up in despair when six "Marys" came down the trail from the jungle. They were very elaborately dressed for the great occasion in many strands of colored bead-money wound around their waists and hips. Their short curly hair was powdered with white lime dust and they were adorned with ear and nose ornaments. Aside from these decorations clothes were entirely absent. They were much more tractable about being photographed than the men, and we were able to get some interesting pictures.

When the time came to give out the jewelry and trinkets we had promised as a reward, great confusion arose among the

Photo by M. N. Fairbank

THE AUTHOR PRINTS THIS PICTURE WITH CONSIDERABLE MISGIVINGS

bushmen. The men insisted that they should all receive exactly the same kind of presents. But each woman wanted one more trinket than any of her rivals. There seemed to be no way to satisfy everyone until Wells, having the advantage of previous experience, told us to close the jewelry box and to give each woman one piece whether she liked it or not.

Then he waved his hand and said, "Master he mad more! You feller Marys sing out too much, altogether! You feller Marys gammon along white feller marsters. Go! Altogether you go! Walk about! By'n bye you stop along house belong master. Master he catch 'em plarnty tobacco. Maybe you feller kill him talk-talk, master givem you piecee tobacco."

Upon hearing the word tobacco mentioned the bushmen and their wives smiled happily and soon departed in peace. We, also, bade goodbye to Adam and Wells and made a late start for Hog Harbor. But as the *Illyria* had to contend with a head wind and a strong adverse current we did not reach our destination until the next morning.

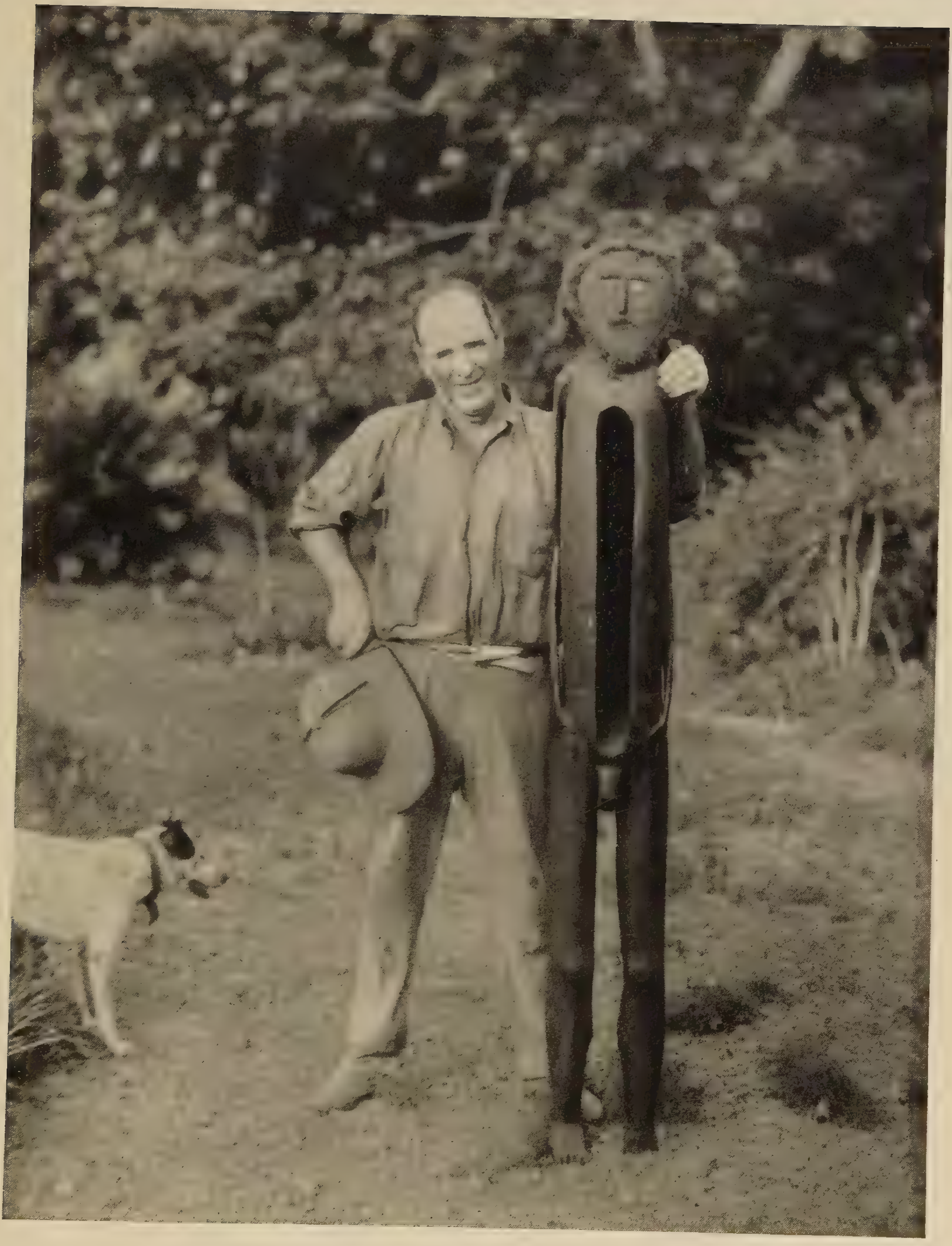
At Hog Harbor, on the island of Espiritu Santo, we found the largest cocoanut plantation and the most jovial planter in the New Hebrides. The plantation occupies a broad plain between the base of a long high cliff and the ocean. Nearly two hundred natives are constantly at work collecting the fallen cocoanuts and bringing them in Ford trucks to the drying sheds. From the nuts four tons of the juicy meat are extracted daily and this amount when dried makes two tons of copra. The latter sells at a price varying from $70 to $100 a ton, so it can readily be seen that the annual income from a plantation may be surprisingly large—especially if the manager, like

Robertson, is clever enough to get his labor nearly free of charge.

To understand my last statement it is first necessary to know something about Robertson. He is a husky, hearty, deep-voiced Scotchman who has been through more adventures in each year of his life than has Nick Carter in several volumes. He ran away from Scotland at a very early age (though not so early as to interfere with the acquisition of an "A No. 1" Scotch accent) and fought all through the Boer War. Then he was for many years with the British army in India—stationed near the Khyber Pass. He went with Younghusband on his famous expedition to Lhasa—which in itself would have been enough of an adventure to last most people a lifetime. Robertson, however, fought all through the World War, first in the Gallipoli campaign and then in France.

Now he has "retired"; he merely handles two hundred unruly native "boys" and goes on recruiting expeditions for three months each year! He has grown so fond of his present life that he hates to leave his own domain. "I'm a bit of a despot here, you know," he said. "I'm 'Master Robie' and when I clap my hands things begin to happen! But when I go to Sydney I'm no better than any other man in the street and man! I'm scared to death of the traffic!"

But to get back to the cheap labor which "Master Robie" secures so plentifully and keeps so cleverly. There is a trick in how he does it. The first part of his procedure is much like that of any other recruiter. Since the bushmen on his own island have plenty of food, pigs and wives, and since it is a serious crime to sell to them the rifles and ammunition which are the only things they desire, it is necessary for Robertson



Robertson, a Typical Planter of the South Seas

Standing beside an unusual drum found near Hog Harbor in the New Hebrides

and his assistant to board their little yawl and search for recruits on other islands where the necessities of life are not so plentiful.

"I have to compete with all the other British planters," explained Robertson, "but I attack the problem in a different way. As an inducement to work they offer the Kanakas money —twenty pounds a year. But the Kanakas know from bitter experience that the money they receive at the end of their term of work will do them no good. They can't eat it. They can't buy wives with it. All they can use it for is to buy a cheap "bokkis," a chest filled with jewelry, mirrors and trinkets. Their three years of work are wasted.

"Now I use a little better psychology. Pigs are what the natives want—not money. A good pig can be swapped for a wife. On that point hinges my whole scheme.

"When I found that the boys prefer pigs to money I devised a scheme which leaves everyone satisfied. When I'm recruiting I go ashore, the same as the rest, with a second boat full of boys with rifles which stays just off shore, you know, to deal with any possible disturbance. I give a present to the chief and his young men and I say to him, "Maybe you feller Kanakas wantem Marys stop along house belong you." Usually at least one of them will say, "Yes, marster, me wantem Mary. Me no gotten pig." So then I say, "Maybe boy come stop along place belong me three years, me givem boy bokkis, me givem boy money and *me givem boy pig!*"

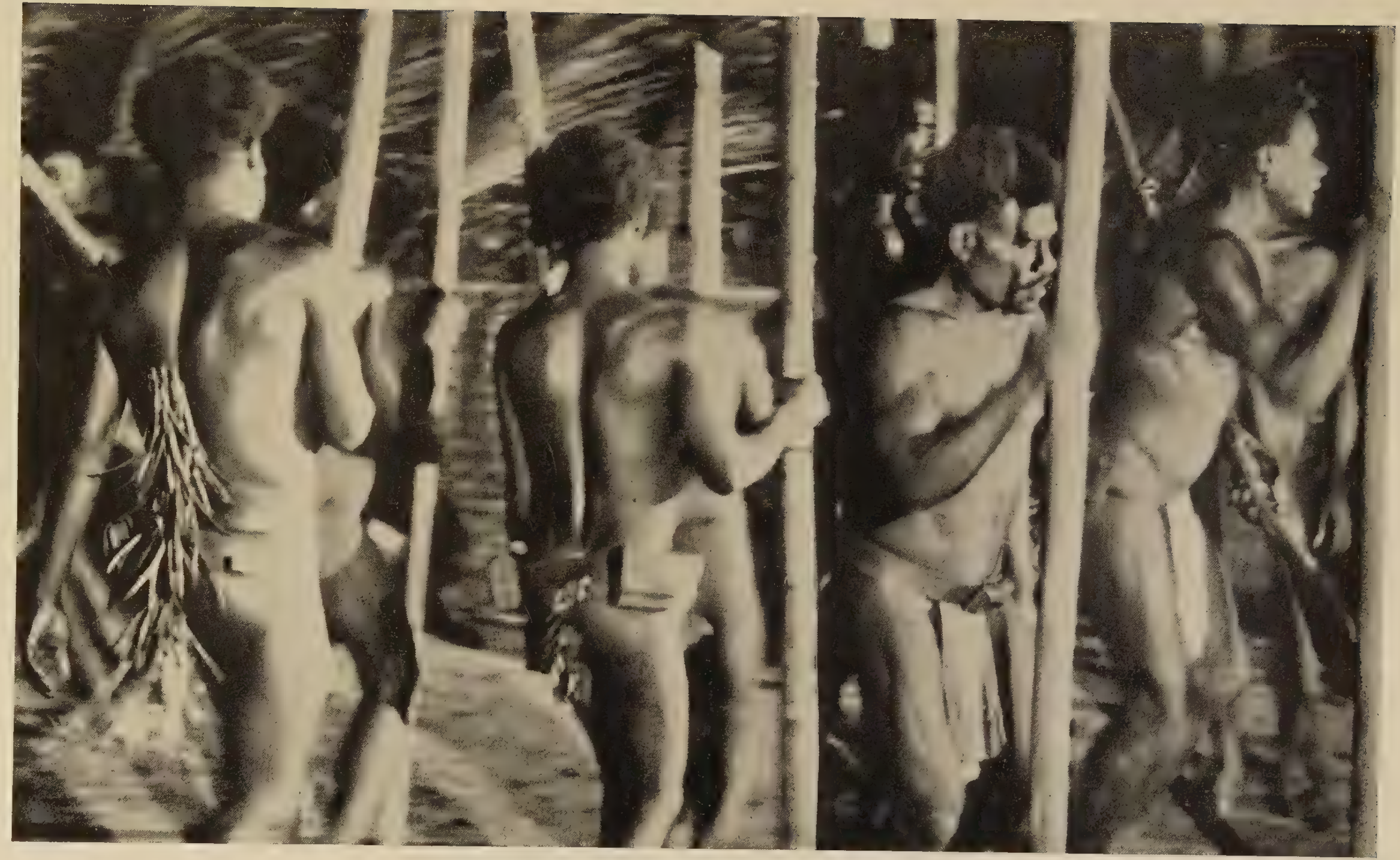
"Well, I have a fair reputation, y'know, and the boys believe me and they come and work for their three years. At the end of their time they go happy with the pigs and their 'bokkises,' and although I keep most of their wages they often come back to work for me again."

"Yes! Yes!" we said, "but where do you get the pigs? We were told that no planter could keep pigs because the bushmen steal them."

This was just the question "Master Robie" had been waiting for. He grinned broadly. "Well, man, you see it's like this—I've bought a little island—nobody else knows just where it is—and I have three men there who do nothing but raise pigs. It's wonderful what you can do with pigs, my boy—it's mar-r-velous!"

While we were having a glass or two of beer with Robertson in his little unscreened summer-house we noticed several tall, pot-bellied natives wandering around the plantation with guns. Robertson explained that they were some of the friendly bush-natives from the interior of the island. The bushmen fight continually among themselves and prize their ancient rifles above every other possession. They are not allowed to buy more rifles or rifle ammunition, but each man owns one or two old brass cartridge cases and a bullet mold. In case of battle each native can fire only one or two shots and then has to run for home. There he unloads a shotgun shell or "Kartige belong pigeon," melts the shot to mold a rifle bullet, recaps his old cartridge case and reloads it with the powder from the shotgun shell.

"A bushmen never lets go of his rifle," said Robertson. "If there is a war dance he dances with his gun in one hand and when he sleeps he uses it for a pillow. Some of the younger generation who have no rifles must use a bow and arrows for their protection. An arrow is just about as dangerous as those



Dance of the Primitive Bushmen at Hog Harbor

Notice the leather cartridge cases and the rifles to which they cling throughout the performance

old guns, for these fellows are not good marksmen, but a rifle is necessary to the prestige of an older man. Many a bushman has been murdered for his gun. In fact a man died only last night from poison put in his food because of a dispute over an old Snyder rifle.

"That's why these natives look so uneasy today. They fear a reprisal from the family of the dead man. You notice there aren't any women about—they are not allowed to leave home when a fight is expected. Oh! no! They won't fight down here—they have to keep on the right side of me because I supply the shotgun shells. The whole affair will blow over in a few days and then we'll have peace for another couple of months. A queer lot, these bushmen! They don't progress very much."

Schmidty, Walt and Frank found Hog Harbor an ideal place for collecting. Robertson gave them each a bed in his house and a room in which to work. He also detailed three of his best plantation boys to guide them along the jungle trails and to help with the collecting and the skinning of specimens.

Working conditions were ideal and bird and insect life was plentiful. Frank succeeded in getting some very unusual bats from a cave on the mountain side. Schmidty found a new variety of scorpion under the bark of a teak tree. Walt made a large collection of brilliantly colored little birds, and also shot some parrots, the first we had seen. He continued work on his paintings and made several pen and ink sketches.

By the time we were to return to Wells plantation to start the Big Nambas expedition they had transformed Robertson's whole house into a scientific camp. Thus we felt no hesitation in leaving them for several days because there seemed to be plenty of interesting work for them to do.

We found Adam and Nicholson waiting for us. The missionary was a short, stocky, ruddy-faced Australian. He had a pleasant manner and quick, alert eyes.

"I have asked Wells to come with us, too," he said. "I think it will be an advantage to have three experienced men on this trip."

At dawn we left Wells plantation for the Northwest coast of Malekula island—the heart of the Big Nambas territory. A fierce rain squall beat down on us for some time, but we rode it out without great difficulty, and reached our destination late in the afternoon.

The coast was steep, mountainous and thickly wooded. We could find no anchorage except in a small open bight at the foot of the trail to the Big Nambas villages. The captain thought it a very poor anchorage, for the ocean swell swept in upon us, making the yacht roll badly. However, there was no alternative. He had to make the best of it.

"Now to tell the natives that we are here!" said Wells. "Give me two sticks of dynamite to explode in the water. That is the regular recruiter's signal for a 'talk talk.' "

He lashed each stick of dynamite to a small piece of wood and inserted fuses. Then he wet his finger and carefully tested the direction of the wind.

"Always throw the dynamite to leeward," he explained. "A few years ago a careless friend of mine tossed a stick overboard without looking which way he threw it. The wind and current brought it back to his ship, where it exploded. The whole stern was blown away; two natives were killed and my friend was seriously injured."

Lighting the fuses, Wells threw the two packets overboard. A few seconds later they exploded with a tremendous roar, which reverberated like thunder along the shores and against the cliff.

We waited for half an hour, but no answering shouts or any signs of response could be detected.

"I guess there is no one near the shore," said Nicholson at last. "We shall have to send our two plantation boys up to the village to confer with the chief. They can speak the Big Nambas dialect, and perhaps they can persuade the chief to come to the shore."

Luckily Nicholson had brought these two boys along in case they might be needed, and now he gave each one a message for the chief. Mr. Cook rowed them ashore just before dusk. We watched them climb up the steep face of the cliff and then vanish into the dark underbrush.

They returned to the shore a little after midnight and signalled with a flashlight for the launch. Once on board they delivered a message from the chief.

"Big feller marster he say he come along beach along zip (ship) same time sun he commence. Byme by white marster maybe go along place belong big feller marster."

We all got up before daylight the next morning and at the first gleam of dawn we saw five black figures dimly outlined against the gray beach. Nicholson was very excited.

"They have come," he said. "I will go ashore alone to talk to them. A ship was fired upon here recently and if too many of us go ashore at once they will think we are a punitive expedition. Don't worry, I shall be perfectly safe."

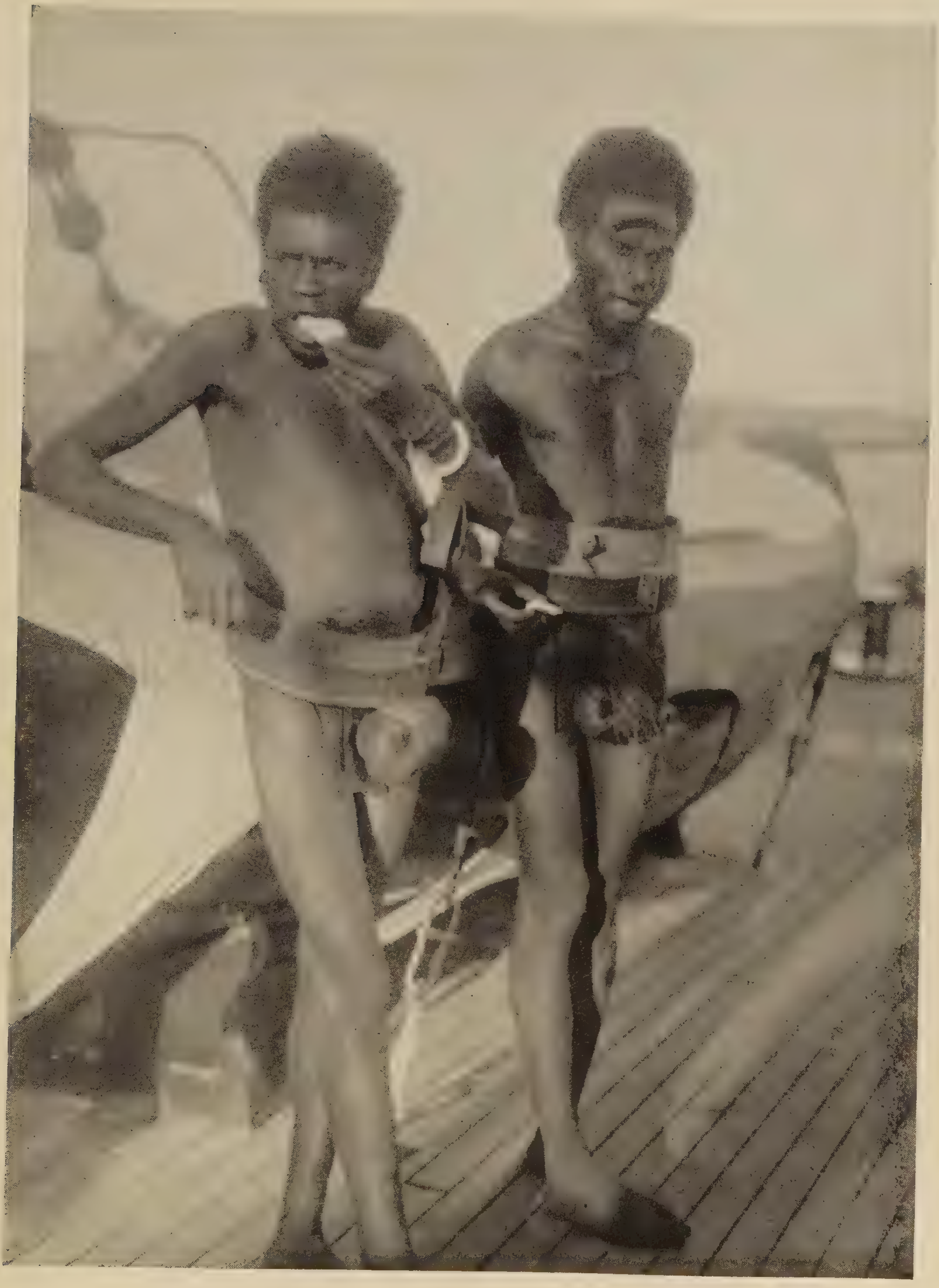
Savages have no sense of the value of time. Hours are often required to make a single decision. In this case Nicholson had to talk to the chief for nearly an hour to persuade him to come out to the ship. The chief and one of his counsellors finally got up courage to come on board, but the other three were afraid they might be kidnapped. The chief's reputation for bravery was probably increased a hundred fold by his short visit to the *Illyria.*

Maloon was the name Nicholson gave the chief. He was about 5 feet 8 inches tall and fairly well formed. His broad face was set with intelligent eyes and a thick nose. He wore several bamboo combs in his frizzly reddish hair and a thick wooden belt around his waist.

Maloon's counsellor was older, more pot-bellied and less intelligent in appearance. Nearly all the time he was on board the *Illyria* he wore an expression of dazed bewilderment which amounted almost to a stupor. He took no interest in what was going on.

Maloon, by way of contrast, seemed eager to understand what was around him. He had brought a gift of yams rolled in tobacco leaves for "man belong zip" and one of his first acts was to present it to Cornelius. We gave him a ham sandwich in return. He gobbled it up at a tremendous rate.

Maloon was overcome by the height of the masts. Every few minutes he would lean back to gaze up at them. His piercing glance seemed to take in everything above decks and within a few minutes he lost all signs of fear. He attempted to touch everything that interested him. Apparently he was accus-



MALOON, THE BIG NAMBAS CHIEF (ON RIGHT), AND HIS PRIME MINISTER VISIT THE *Illyria*

tomed to use his sense of touch almost as much as his sense of sight in comprehending a strange object.

After a short while we took Maloon into the engine room. He was so amazed by the tangle of pipes and machinery that for a few moments he was quite as bewildered as his counsellor. This change from the simple things to which he was generally accustomed seemed to terrify him.

Cornelius gave him a small flashlight and showed him how to operate it. This was one thing the chief could understand. He switched it on and off with exclamations of delight and took it up on deck to show his counsellor. On the way up he passed in front of an electric fan which happened to be running full blast. As the cool air touched his bare skin he jumped back as if he had been shot. Then he turned and looked very closely at the fan. I thought he was going to thrust his hand into the blades, but instead he merely pointed at it and laughed very loudly.

Nicholson talked to Maloon for a long time and finally secured his consent to an inland trip by the white men.

"All right," said Nicholson, turning to Cornelius, "seven of us can go up to the village. The chief will lead the way, and he promises to protect us."

"However," he added, "no one can take any firearms because the Big Nambas are short of weapons and if they saw guns within their grasp they might not be able to resist killing us to get them."

Dr. Moss, Cornelius, Chuck and Murry were chosen to go with Adam, Wells, and Nicholson. They were taken ashore in the small boat with the chief and his aide. There the three other natives who had been waiting joined them. Burdens of food and cameras were apportioned to everyone but the chief. From the ship we saw them all string out into a long procession headed by Maloon. He led them along the beach a little way and then, parting the bushes, disclosed the mouth of a tunnel-like trail into the underbrush. One by one our friends entered the tunnel and were lost to our sight. The jungle seemed to have swallowed them up.

I now quote from Cornelius an account of the journey to the village—

"Hardly had we left the beach than a steep wooded cliff 200 feet high rose before us. This was the beginning of a terrible eight mile climb through the tropical forest.

"The country is composed of steep knife-edge ridges three or four hundred feet high, rising one behind the other to mountains in the center of the island. The trails are built along the ridges wherever possible so that enemies can be seen approaching at a distance. However, the natives do not hesitate to make their paths branch into ravines whenever it seems convenient. We followed the dry bed of a stream for a while and then crossed more heights. As we rose in altitude the ground became wetter and the district more thickly wooded.

"The tall grass was an ideal place for an ambush, as men standing within an arm's length of the trail would have been completely hidden. We were not at all reassured by Wells' story of how a punitive expedition of French and British Marines had been forced back almost dead with exhaustion and with many men wounded, having narrowly escaped being entirely cut to pieces.

"The chief, however, had been trying to make up for the bad reputation of his tribe by being as helpful and as agreeable as possible. He cut staffs for us to use in climbing the steep trail and several times helped us over exceptionally bad spots. Nicholson also pointed out that these bushmen were carrying no firearms, which was very unusual.

"Finally, after struggling along until nearly mid-day, we reached the village. At the first sign of our approach all the women and girls had fled, uttering screams, perhaps more coquettish than frightened. A few small boys remained in sight and we saw some bearded men peering out of the woods.

"Maloon called to his people to return. Soon a few men straggled into the clearing, but the women would not come back. The village consisted of a number of thatched houses, such as we had seen at Wala, but they were higher and of better construction. One was a club-house, but try as we would Maloon would not allow us to enter. Through the doorway we could see human skulls hanging inside.

"The natives were so excited and ran about so fast that we could not take pictures of them. Perhaps this was just as well, for they were afraid of the cameras and might have become angry had we insisted on using them.

"More and more men straggled into the village until we were surrounded by at least thirty of them. Some squatted down on their haunches and gazed at us steadily for minutes at a time. Others were more inquisitive. They had never seen white men at close range before and were not satisfied merely to see us, but insisted on feeling of us. They squeezed our arms and legs and rubbed our stomachs. It was not a pleasant sensation, for they were ugly and greasy and we knew they were cannibals. However, Nicholson and Adam had warned us we might be handled and had told us that if we took it amiably the Big Nambas would consider it a sign of friendship. We did our best not to resist, but could not refrain from pushing away one or two of the men who became too inquisitive.

"Presently the savage throng began to hem us in entirely too much for our satisfaction. They bumped against us and uttered unfriendly grunts. To relieve the situation Nicholson asked Maloon to lead us to the devil-devils. When he did so the cannibals followed, but we kept moving about so that they could not surround us. The devil-devils were about the same as those we had seen at Wala.

"When the savages tried to hem us in again we went back to the village and sitting down with our backs to the wall of a hut, opened our lunch bags and began to eat. We motioned the natives to keep away to give us room to spread out our supplies.

"Suddenly a great savage-looking fellow came up to one of our lunch baskets and ripping it open, began taking things out. Without any hesitation Adam jumped up, pushed the man roughly away and reprimanded him sharply. We were frightened, for we feared the Big Nambas would resent such rough treatment of one of their warriors. However, Adam assured us he had done the right thing.

" 'That fellow was deliberately trying to steal our lunch when he knew he shouldn't,' he explained. 'If I had let him get away with it he would have immediately done something worse and soon the whole pack would have been on us. You must use child psychology with these natives—nip any mischievous act in the bud or you will get into serious trouble.'

"Adam seemed to have the right idea. The natives backed away slowly and squatted down on the ground all around us without showing any signs of danger. They were ugly looking fellows, but we seemed to be masters of the situation.

"While we were eating Nicholson had a long talk with Maloon.

" 'I asked the chief whether we could go any further inland,' said the missionary, 'but he refuses. He says that this village is now at war with the next one, which is only a few miles further up the mountain side. Although there is a lull in the fighting today, several men have been killed during the last week. The chief expects an attack on this village this afternoon or evening, for his scouts have reported that the enemy are gathering. Consequently he advises us to return to the shore as quickly as possible so as to avoid any chance of danger. I think we have seen nearly everything of interest here. We may as well follow his advice while we are able to do so.'

"Well," concluded Cornelius, "that is about all there is to tell. We distributed the presents of tobacco which we had brought and gave the chief one or two special gifts. The natives did not attempt to impede our progress on the return trip, though they could easily have done so, and so after walking the eight miles again we arrived safely back at the beach. Our trip to visit the cannibals had been as successful as we had hoped, though not as exciting or dangerous as we had anticipated."

That evening we weighed anchor and sailed away toward Hog Harbor to pick up the scientists and deposit our guests before heading for the Solomon Islands.

CHAPTER VIII

WAR CANOES OF THE SOLOMONS

THE skill of our medical man, Dr. Moss, met with a severe test during our three day cruise from the New Hebrides to the Solomon Islands. Mr. Briggs, the second mate and radio operator had suffered from sunstroke at Hog Harbor and now to make matters worse he came down with quinsy (an infected tonsil). His throat became so painfully swollen that each day it was more difficult for him to breathe. He could not eat at all.

Although Dr. Moss had never practiced surgery he decided that Mr. Briggs's condition had become so critical that he would have to operate. On each of the first two days at sea he attempted the necessary lancing, under local anæsthetics only. Neither attempt was successful. The pain was too intense for Mr. Briggs to endure. On the third day Dr. Moss decided that since it was now a case of life or death he would make another attempt, this time using the more dangerous ether. We spent several hours transforming the laboratory into a hospital and getting ready everything that might be needed. Then Mr. Briggs was brought in and laid on the table.

This is no place for gory details. It is sufficient to say that the operation lasted over an hour; and that of the six men who were required to hold down the patient two had to leave the room because of faintness. Dr. Moss remained cool through the whole ordeal and in the end announced that he had been successful. And so he had. Mr. Briggs recovered so fast that he was able to operate the radio again within a week.

This was first-hand proof that it is essential to have a medical man on expeditions such as ours. Further evidence came later on.

The Solomons are an even more remote island group than the New Hebrides. They are mountainous and still contain very primitive native tribes. As long ago as 1568 the gallant Spanish adventurer Mendana landed there but the advent of civilization has been so slow that at the beginning of this century there were only fifty white men in the whole group. Now planters have begun to come in increasing numbers but even today no one dares to visit the interior of several of the islands. Many of the native tribes are still at odds with the whites and sudden death has overtaken numerous foolhardy adventurers. Most of those who have been killed have been eaten.

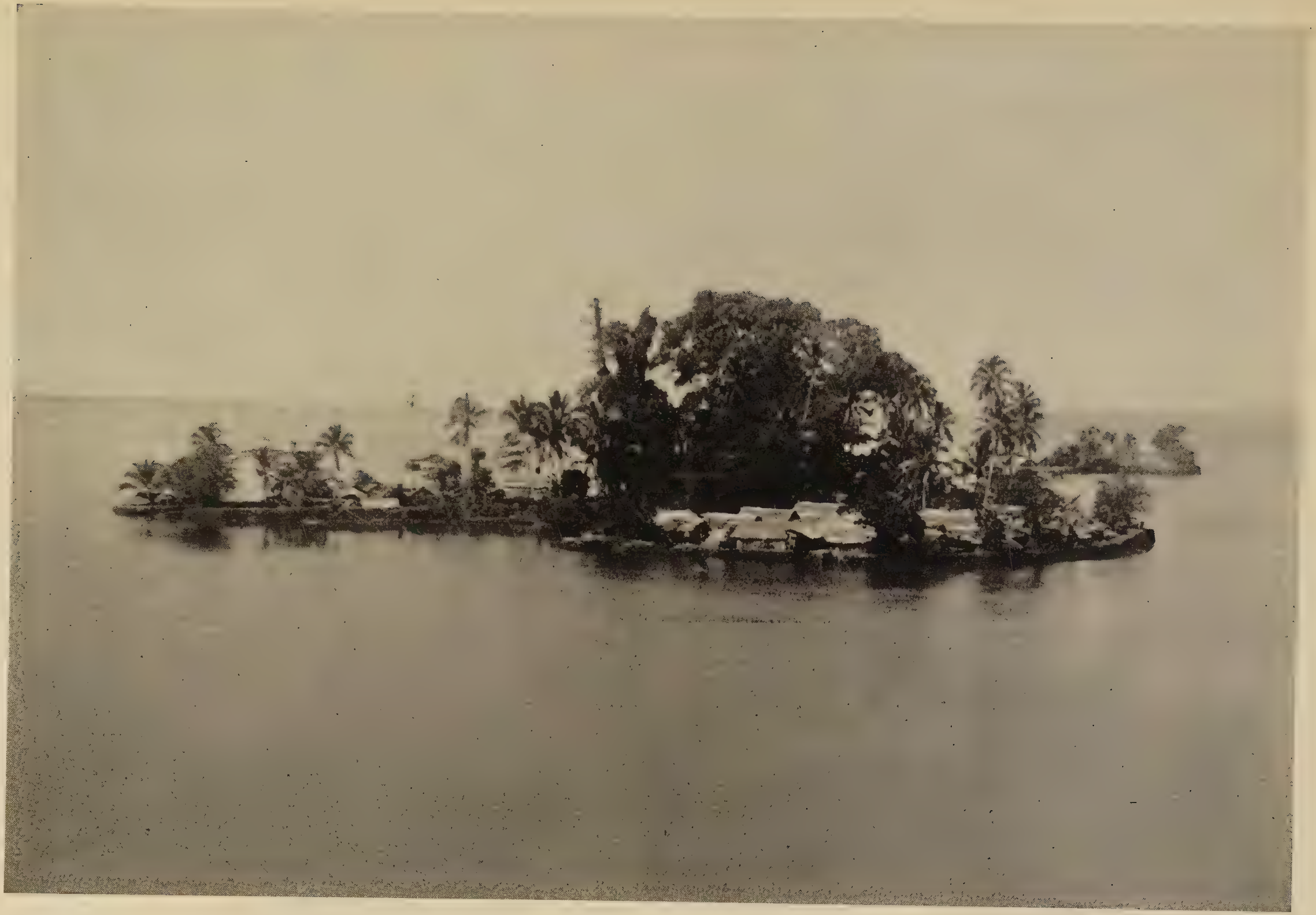
We cruised past the big easterly island, Malaita, to the port of Tulagi on Florida island solely in order to secure permission from the British government officials to do scientific work. Although Tulagi is the main shipping port of the Solomons, it is a small and rather uninteresting commercial town. We stayed there no longer than was required to finish our business and then sailed back to Malaita where we planned to start work.

Dr. Moss, however, remained at Tulagi because he felt he could best accomplish there his task of taking anthropological measurements and blood tests of the natives. When he rejoined us a week later at Ysabel Island he reported that he had measured and analyzed over 150 natives—a tremendous task for one man to have surmounted in one week. He was collecting these figures to further an experiment which he has been carrying on for several years to trace race relationships by head measurements and blood tests. The results of his researches will soon be published.

Our first stop on Malaita was at Auki which, to be accurate, is not on Malaita at all—since it is a tiny artificial island a quarter of a mile offshore.

Hardly had we anchored in the strait between Auki and the mainland than we found our ship surrounded by native men and boys who leisurely paddled about in small canoes. They had rounder faces and more regular features than those we had seen in the New Hebrides but a still more striking difference lay in the fact that many had bleached their hair to a brilliant peroxide-blonde shade.

Nor were their canoes designed in the same manner. Those in the New Hebrides had been dug out of a single log. They were ungraceful and so lopsided that an outrigger was needed to keep them right side up. These canoes, on the contrary, were masterpieces of workmanship. The sides were made of a number of longitudinal strips about 1/3 of an inch thick each of which had been carved from a separate piece of wood, small knobs being left on the inside opposite the bearing points of



Auki, an Artificial Island Built by the Natives from Coral Blocks

the ribs. The ribs were placed about eighteen inches apart and varied in number with the length of the boat. Each outside plank was fastened to each rib by a vine-lashing which had been threaded through a hole in the projecting inside knob and then wound around the rib. The outside planks had also been sewn together with the same material laced through holes drilled for the purpose. The seams were then caulked with a gummy red substance made by chopping up a certain kind of nut. Thus a light strong canoe of nearly any size can be made without the use of a single nail, rivet or screw. No boat built by even the most skillful of white craftsmen is as cleverly or as logically built as this product of the "savages." Nor are the white men's boats so beautiful to the eye or so speedy in the water. The reason is, in part, that the clumsy white man has little success in balancing or handling a small, delicately built watercraft. He is willing to sacrifice speed and beauty to obtain a boat into which he can jump with heavy boots and run no risk of tipping it over.

We sent the captain to the mainland in one launch to visit the District Officer whose house we could see half hidden in a palm grove. Then we ourselves went in the other launch toward Auki which looked far more interesting.

Auki, the artificial island, was constructed years ago on the outer edge of the coral reef by the "salt-water" natives of the mainland who were driven from their homes on the shore by the bushmen of the interior. As in the New Hebrides, the bushmen are afraid to venture into or on the ocean so the "salt-water" people were able to build themselves a safe retreat within plain sight of their enemies. The island, which is about two hundred yards in diameter has been constructed entirely of small coral blocks. The ground level is only about four feet above the water level but the island has safely survived the storms of many years. This is attested by a great banyan tree which towers to a height of nearly 150 feet near the center of the islet. Many smaller trees flourish as well.

The island is almost entirely covered with squat thatched houses. These are one-roomed affairs and on the dirt floors dwell men, women, children and small livestock—all in the same room. The cook-houses are set apart in a special area and resemble an army of pup tents. The cooking and most of the other work is done entirely by the women, who are treated as slaves. They were afraid of us and ran into the houses as we approached.

Besides the dwelling houses there are many boat houses, with sloping ramps leading down to the water. The men spend much of their time sitting about in these boat houses smoking and talking. Once in a while they do a little work on the boats, for that is one of the few tasks the women are not privileged to perform.

Many of the men have pet birds, usually parrots or cockatoos of which they seem very fond. I came upon one rather bedraggled looking man who was feeding bananas to a white cockatoo.

"What name belong this feller pigeon?" I asked.

The native grinned. "He cocky," he said. "He cocky belong me. Me give cocky kai-kai (food). Byme by cocky he fly along shore. Mary (wife) belong cocky stop along house belong cocky. Maybe pickananies belong mary."

I hardly believed that a wild cockatoo with a family on shore would dare to visit a village but the native must have been right for when I approached the bird flew away to the mainland and disappeared among the tree tops.

The same native had another bird with clipped wings which he offered to sell me for ten "sillings." He would not sell the one which had flown away, however, for, as he explained, if he waited long enough he would be able to catch the whole family.

Each adult male native of the Solomons is required to pay the English government an annual poll tax amounting to ten shillings. To the islanders this seems such a tremendous sum that many disputes and some fights have resulted. They find it exceedingly difficult to secure silver, for their regular medium of exchange, strings of shell money, has little commercial value.

We saw some of the shell beads in the process of manufacture. There are two types of beads—"gold" and "siller." The former are made from red shells which are far more scarce than the ordinary blue and white varieties. The shells are smashed into little chips which average about a third of an inch in diameter. Each chip is put into a small vise made of cocoanut shells and laboriously drilled through. The drill consists of a sharp wooden spindle around which fits a wooden ring. A piece of string is carried from the ring to the spindle and wound around it in spirals. By jerking downward on the ring at regular intervals the woman who operates the drill can make the spindle revolve first one way and then the other. They use fine sand as an abrasive.

After several hundred chips have been drilled they are threaded on long strings which are then knotted at each end. Six or seven strings are put parallel to each other between two long flat boards. Coarse sand is thrown between the strings and then the top board is rolled back and forth against the bottom one. The strings of chips hit against each other and after several hours of rolling all sharp projections are ground away. The beads now need only to be washed before they can be put on the market. The regular price for "siller" beads is ten shillings a fathom. "Gold" money is twice as valuable.

After the strings have been in circulation for some time they are apt to become greasy and faded. Then the women regrind them to freshen the appearance. Renewed money, however, is regarded as semi-counterfeit and the value is much lower. No one can deny that in the Solomons the women are the money makers!

We found the men of the village to be a good-natured lot, especially after we had presented them with tobacco and cigarettes. They took us to one of the boathouses where canoes were being built. One nearly finished specimen was over twenty feet long and had a seating capacity of five or six men. Yet we could lift up either end with one hand. The local chief offered to sell it to us for ten pounds. It was so beautifully made that had we had space to carry it we felt sure any museum would have been glad to exhibit it.

Another canoe which had just been completed caught Cornelius' eye. It was a tiny craft only seven feet long, and its carrying capacity was only one man. It was so light that I could easily pick it up and carry it under my arm. The natural wood finish had been embellished with burnt-in designs.

Cornelius was entranced. "What name money for canoe?" he asked.

The owner, a bright-eyed, husky young fellow who wore little but an English felt hat hesitated a long time. Plainly he had been looking forward to using his new canoe himself. Finally he held up his hands with seven fingers outstretched. "Sever puns," he said hopefully.

"Plenty too much!" bartered Cornelius. "Too much altogether! Me give two pounds."

But the native was a shrewd salesman. He finally got four pounds from us for his little boat although, as we later found, one would have been nearer the correct price.

We took our purchase back to the yacht and although the sun had set we made an attempt to paddle it. We found this was much easier said than done. Murry stepped into it very carefully and sat down in the center, but the instant he let go of the gangplank it overturned and gave him a thorough wetting. We rescued Murry, the canoe and paddle, but no matter who tried no one was able to navigate more than ten or twelve yards without capsizing. The natives had gathered around in their boats to watch the fun and as one white man after another met with disaster they shrieked with laughter.

Then, to the amazement of all of us, Schmidty offered to try. He stepped calmly in, sat down, reached for the paddle and then calmly went twice around the *Illyria* without any difficulty.

"I learned how to do this in South America," he explained. "We used the same sort of canoes on the branches of the Amazon River."

Mr. Cook, the mate, nearly came to grief that evening. We had invited the natives of Auki to come to a motion picture show alongside the *Illyria* after dark and Cornelius sent the mate ashore with a message asking the District Officer and his wife to come also. Mr. Cook landed just about dusk and made his way through the cocoanut grove toward the house. When quite near his destination he was suddenly confronted by a native with a rifle. The native, who was a police boy, though the mate did not realize it, muttered some unintelligible words. Taking little notice, Mr. Cook continued to walk on, whereupon the native raised the gun, drew back the hammer and took a good sight at him. The poor mate thought his last moment had come.

"Yeow! Don't shoot!" came a sudden cry from the D. O.'s house. The District Officer himself luckily had been on the verandah and intervened just in time.

"I always keep a heavy guard around the house at night," he explained to us the next day. "Only a little more than a year ago the D. O. of a village a few miles north of here, his white assistant and fourteen native police boys were massacred in cold blood by the bushmen. They were set upon from behind by a horde of savages swinging axes. They never had a chance to escape. We found them half eaten.

"Since it was I who brought the offenders to justice some of the bushmen are planning revenge. My sentries are instructed to shoot to kill anyone who fails to answer their challenge after dark, so it is lucky I happened to see your mate when I did or you might need a new one. He had better learn to speak 'bêche-la-mar' before he goes prowling around at night."

Schmidty had also gone ashore after dark but not into the face of danger. Frogs were the object of his search. Armed with his trusty flashlight he found little difficulty in collecting several unusual specimens. One of them, to which

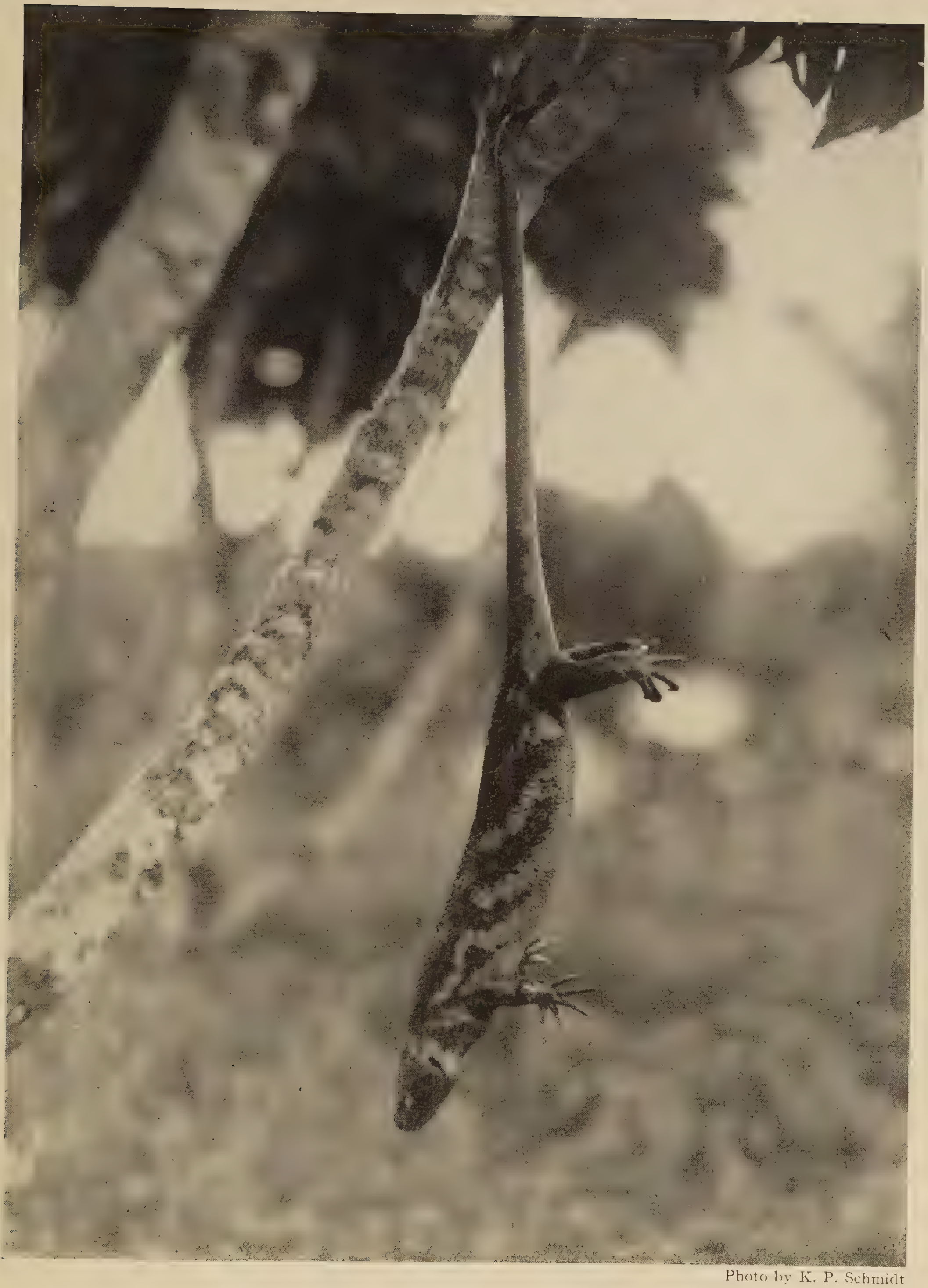


Photo by K. P. Schmidt

The Prehensile-tailed Skink of the Solomons

he applied the unwieldy name of *Ceratobatrachus* was very extraordinary indeed. It had a curious angular form, a loud barking voice and teeth in the lower jaw. The latter attribute makes it one of the most remarkable frogs in the world. Schmidty also captured the toothless *Batrachylodes,* a tiny frog whose voice is a succession of sharp metallic clicks. Both these frogs are found only in the Solomons. Several other species of frogs, one remarkable for its gigantic size, were secured.

The next day we went ashore on the mainland to do some daylight collecting for the scientists. Chuck and Cornelius accompanied Dr. Herre to a point where an inland lake could be seen less than a quarter mile from the beach. The boat was then carried overland to the lake by a dozen native convicts who had been sent for the purpose by the District Officer.

Chuck reported that two police boys had been sent to guard the convicts during their labors. The police boys grew tired of the weight of their rifles, so they gave them to the convicts to carry!

Dr. Herre tried seining in the lake for fresh-water fish, but met with little success. However, he did find several small fishes of the genus *Periophthalmus,* generally known as mud-skippers, which had come overland from the sea. He told us that these fish live out of water nearly all the time, only leaving the land for an occasional bath or when enemies approach.

In the meantime I had accompanied Walt on a parrot hunting expedition. We made our way along a narrow trail through a dense growth of gigantic fig trees. Their tremendous trunks towered to a height of over 150 feet and their foliage was so heavy that no direct sunlight could penetrate the forest roof. Consequently the underbrush was not heavy. Where we were in darkness below, everything was cool and unpleasantly moist and slimy. We could hear all kinds of birds flying about, uttering queer cries but we could not see them because of the foliage.

We stopped at the base of each large tree and looked up into its branches but for a long time were unable to distinguish any bird life. Then we heard a distant musical call—a long drawn out "boo-boo-boooo."

"Sounds like jungle pigeons," said Walt. "They are probably feeding on the ripe figs. Let's see if we can sneak up under them."

We crept along as silently as we could for nearly half an hour. The musical cooing grew louder and louder.

"Now we are under their tree," whispered Walt at last. "I can't see the birds though. Can you?"

By straining my eyes I finally detected a plump form perched on a limb far over my head. The tree was so tall that I felt sure the bird was out of range.

"Well we certainly can't get any closer," said Walt. "Go ahead and shoot!"

I pulled the trigger of the automatic three times in quick succession. Bang! bang! bang! Pandemonium broke loose in the quiet forest. Instantly seventy-five or a hundred of what seemed tremendous birds dropped from the tree top toward us. Just above our heads they spread their wings and darted off in all directions, uttering piercing cries. We were so surprised we forgot to shoot again.

"Holy cats!" exclaimed Walt. "Did you see those pigeons? There were parrots up there, too. I could hear them screaming. And you didn't get any!"

I felt very chagrined at first but when I looked where I had aimed I saw the pigeon hanging upside down by one leg from a branch. Then it relinquished its hold and fell like a plummet. I estimated it would land about four feet behind Walt. It did. Walt almost jumped out of his skin at the crash.

The pigeon was a beautiful specimen, nearly as large as a pheasant in size. The feathers on its back and wings were a brilliant dark blue in color and those below were ash gray. It had bright red eyes and legs. We got three more pigeons and some parrakeets later in the day and returned to the ship puffed up with pride. Schmidty was pleased and after he had taken their skins gave us the pigeons to eat.

Frank Wonder had shot two fine parrots, a male and female of the same species. Contrary to the usual rule the female was more brilliant in color than the male. She was brilliantly red and purple while the mate was merely green all over. These were the most beautiful birds I had ever seen.

We left Auki that evening and during the night Captain Boutilier navigated from Malaita across Indispensable Strait to Tunnibuli Bay, Ysabel Island. The bay was completely surrounded by jungle-covered hills except on one promontory where a clearing had been made. Perched on the hillside we could see a small white house with a red roof. The only other sign of the presence of white men was a large motor yacht anchored in the harbor.

We went over to this boat in our skiff. A uniformed sailor who met us explained that she was the *Renandee,* the government yacht of the Solomons. He said that Mr. Barley (the acting Resident Commissioner of the Solomons) had gone ashore to visit a planter named Bignell who lived about three miles up the coast. The house on the shore, he told us, belonged to Captain Hill, the District Officer.

We went ashore at once with all our scientific apparatus and climbed up to Captain Hill's house to ask permission to collect birds. He was away, so we had to go hunting without his consent.

We walked into the jungle back of the house and soon found ourselves in the wildest place we had yet been. We struggled up and slid down steep banks, we crossed stagnant pools on slippery logs and finally we became so enmeshed in vines and creepers that Schmidty had to cut a trail with his machete. Within half an hour we began to feel exhausted.

The twisted trunk of a huge banyan tree finally loomed before us. Near the top we could see several glossy maroon-colored parrots fluttering about from limb to limb. It seemed too bad to shoot them even in the cause of science, but as I had the most powerful gun I fired first. One parrot came fluttering down into the swamp and the rest followed out of curiosity, giving vent to piercing screams and harsh cries. Within a few seconds I was able to drop five more on the wing.

We spent nearly half an hour trying to find where the birds had fallen, but could only locate four altogether. Schmidty and Walt skinned them very carefully. They said the color was most unusual and it has turned out since that these were the most brilliantly colored parrots collected on the whole expedition. They now make a beautiful display in the Field Museum.

Influence of Civilization in the Solomons—a Young Girl of Ysabel

On our way back to the ship Frank Wonder set several animal traps in the hope of catching some mammals. His work was in vain, for every time he returned to inspect the traps he found that the robber crabs had set them off before any other game could be attracted by the bait.

After lunch we went over to the *Renandee* again. This time we found on board not only Mr. Barley but also Captain and Mrs. Hill and Mr. and Mrs. Bignell. They were very cordial indeed and invited us to dinner on each of the two following nights.

Unfortunately we were instrumental in causing the *Renandee* to take sudden departure. We had heard at Tulagi, nearly a week before that another government boat, the *Veronica,* had gone on the reef near the northern end of Malaita. Cornelius happened to mention this fact to Mr. Barley. So slowly does news travel in those regions that he had not heard of it and he was both astonished and annoyed to learn of the wreck. They started off at dawn the next morning to see if they could offer assistance.

The Bignells took most of us to their plantation for tea. They live in a spacious house on a hilltop facing the sea and overlooking the valley which contains their plantation. Mr. Bignell is an Australian. He ran away from home at the age of thirteen and had gone twice around the world before he was seventeen. At that age he came to the Solomons where he has remained for twenty years. Like most of the old South Sea planters he has produced a fine plantation where once stood dense jungles. Nevertheless, at the time of our visit he was much put out by the fact that the price of copra had just dropped 30%.

"It costs a pretty penny I can tell you," he said, "to keep three children in a private school in Sydney."

We advised him to send his sons to Harvard instead.

Mr. Bignell was "hipped" on the subject of crocodile hunting. Although he had shot only a few during his whole twenty years in the Solomons he maintained that some of the biggest crocodiles in the world lived in a swamp not far from his house. He became so enthusiastic that he convinced us too.

"Just before daylight," he said, "they all go out from the marsh into the ocean. If you sit on the footbridge over the creek which drains the marsh you will see any number of them."

Next morning the first glimmer of dawn found us sitting on the footbridge. We waited until nine o'clock but not a single crocodile appeared. We went to the Bignells' to seek an explanation.

"Too bad," said Bignell cheerily. He could afford to be cheery after a good night's sleep. "It was your own fault. Your outboard motor is too noisy. All the crocodiles were scared out of the swamp before you got there.

"However," he continued, becoming enthusiastic again. "We'll get one tonight sure. A big crocodile swims along the beach past my copra drying shed every night. All we need to do is to put a bait on the beach and hide in the copra shed. The crocodile will come ashore and that will be the end of him. He will be sixteen feet long at least."

Schmidty and I were convinced. We left the *Illyria* after supper that night, although it was raining hard, and headed for the Bignell plantation in the little outboard motorboat. We lost our bearings in less than no time and soon crashed onto a reef in the pitch darkness. The propeller was damaged and the propeller pin sheared off, but we finally reached the Bignells' by rowing the whole three miles.

We left our boat a long way from the copra house and sneaked up to it stealthily on foot so as not to alarm the crocodile. At the shed we found not Mr. Bignell as we had expected, but a plantation boy lying under an overturned canoe and armed with a rifle, a big pipe, and a "bokkus" of matches.

"White master he sleep along house," he calmly informed us. "He say you feller stop along me maybe you catch him croc'dile."

Bignell had promised us a place to sleep in the drying house, but we found it securely padlocked. It was raining hard and the mosquitoes were already upon us, yet we could not go back because we could not find the *Illyria* in the dark.

"It is a cinch we won't get any crocodile tonight if that damn nigger keeps lighting his pipe every ten seconds," said Schmidty. "Let's find a place to get out of the rain and sleep. Perhaps we can get under the copra shed."

Accordingly we smeared ourselves thoroughly with mosquito dope. Then I led the way to the copra shed and got down on my hands and knees to crawl under. A foul smell warned me to be careful. Schmidty flashed on his light. I was face to face with an enormous white pig!

Next we broke into another copra drying shed, but we found it had a corrugated concrete floor. Then we lay down under the eaves, but we had to get right up again. We found the pigs had been there first!

The situation grew worse and worse. We tried to sleep standing up under the eaves, but one can't do that. During a lull in the rain we went to the beach and lay down, but that only sufficed to cover us with sand which stuck to our guns, our oilskins and to the mosquito dope.

Giving up all hope of keeping dry I lay down in the wet grass under a palm tree near the bait and soon went to sleep. Crash! A cocoanut landed six feet from my head. I had to move again and to add to my discomfiture I found I was covered with ants.

This time I went to an open spot near the beach and tried lying down there. Just as I was about to doze off I realized that I was between the ocean and the bait. But I was too tired to move again and soon fell asleep. I dreamed a horrible dream. The crocodile came out of the water and got hold of me by the leg. He was just about to bite it off——

"Wake up," said Schmidty shaking my leg. "I am cold and wet and covered with mosquito bites. I can't stand this damn place any longer. Let's get into the boat and row!"

So we did. It was the worst night either of us have ever spent. Needless to say we did not get any crocodiles in the Solomons.

By next evening we had recovered sufficiently to have dinner with Captain and Mrs. Hill. A charming and gracious couple, they made every effort to unbend to the queer Americans. They even consented to play poker, and strange to say Mrs. Hill "cleaned up" on everyone. I think she was less surprised than we were, for she hardly realized the luck she was having.

The conversation turned to the irregularities of that remarkable South Sea language "bêche-la-mar" which is often confused with the Oriental "pidgin English." Some of the expressions were so quaint that I thought it worth while to make a list of them.

Bullamacow	Either bull, calf or cow
Basket belong egg	Egg shell
Pigeon	Any bird
Mary	Any girl or woman
Pickinany	Any child
Sore leg	Sick
Sore leg along head	Headache
Savvy	Know, understand
No long way	A short distance
Long way	Any distance
Long, long way	A long distance
Long, long way too much	A very long distance
Kill	Injure
Kill dead	Injure severely
Kill dead finish	Kill
Mrs. Belong Government	Wife of any District Officer
Mrs. Government	
Zip	Ship
Lannish	Launch
Fokkus	Fruit bat
Capsize	To tip over, to pour
What name	Prefix to begin a question
Kai-Kai	Food
Gammon	To lie or deceive
Kanaka	Any native boy
Big feller marster	Native chief
My word	Expression of astonishment
Plenty	Some
Plenty too much	Enough
Belong	Always used to denote possession
Man belong Jesus	Missionary

When these words are put into sentences some very humorous combinations result. For instance, a native chief once came to Mrs. Hill to ask for some medicine for his sick cow.

"Bullamacow belong me he gottem sore leg along belly all time too much," explained the chief. "Maybe Mrs. Government fix him bullamacow me glad plenty too much. Maybe Mrs. Government no fix him bullamacow byme bye belly kill him dead finish."

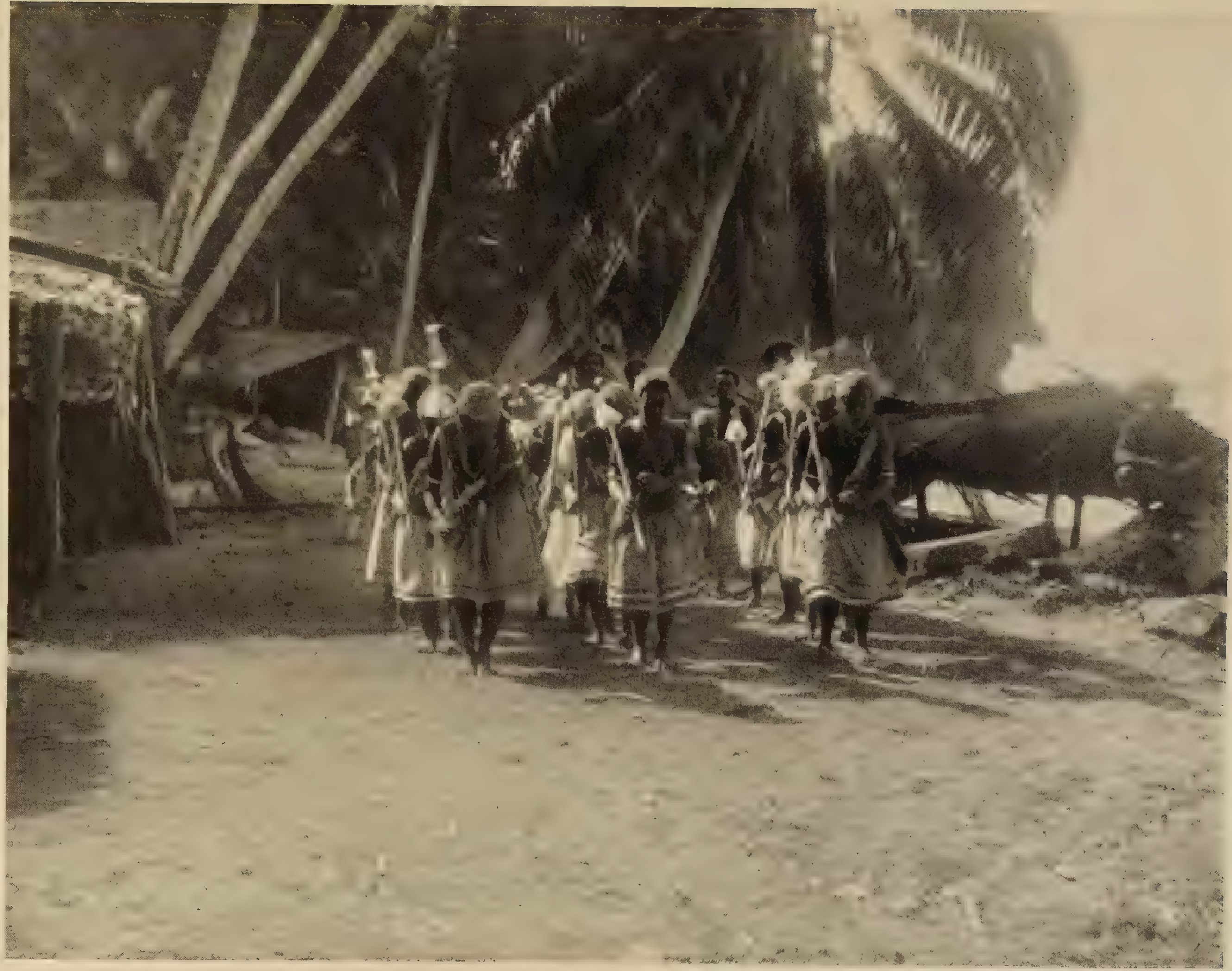
The prize story of this kind was told to Dr. Moss in Tulagi. The natives have grown accustomed to the imported automobiles but when the first aeroplane came over them they were greatly amazed. One black boy was heard to gasp, "My word! Motor-car belong Jesus!"

On the next day we made a visit to Sowa, a small native village about ten miles north along the coast from Tunnibuli. Captain Hill had told us that if we started early we might arrive in time to witness a festival which was to be held there. We skirted the jagged outer reef for the entire distance, and the strain of navigation coupled with the incessant rocking of the boat, the deafening drone of the motor, and the glare of a scorching sun wore us all out by the time we reached the village.

Sowa consisted of thirty-five or forty thatched huts all jammed closely together on a narrow shelf of beach at the head of a small bay. Steep cliffs on all but the ocean side precluded any possibility of expansion.

Some husky Kanakas waded out to help us through the orderly ranks of green rollers and assisted us to drag our boat up the beach to safety among their own war canoes.

We had indeed arrived on a feast day. Over a hundred



Dance of the Women During the Feast at Sowa

guests had come by land and sea to participate in the celebration and everyone was dressed in all the style they could muster. The women wore printed cotton skirts of bright colors. As usual, they had bleached their hair with lime to a discordant yellow shade. The men had attired themselves in clean red and khaki lava-lavas. Only the children were content with their usual costume—a string of beads apiece.

We had come rather late. The men's dance was already over and the participants were now sitting at long benches greedily eating canned salmon—the food for which any Solomon Islander will sell his soul—or even go to work. Near each man waited several children, each with the hopeful expression of a dog under the dinner-table, ready to pick up scraps or lick the empty cans.

Although the men seemed far more interested in food than in beauty, the women proceeded to give their dance. About fifteen of the best (perhaps I should say strongest) looking armed themselves with "dance sticks," (bamboo canes ornamented with woven bark designs) and formed in parallel ranks, three abreast. Someone beat time on a drum and all the dancers broke into a chant or song—that is, it might be called a song. They beat time with their feet and made rather weird motions with the dance sticks. Then they all bent over and slowly took six steps forward, singing the while and waving their sticks. Then they took six steps backward and stopped singing. The dance was finished.

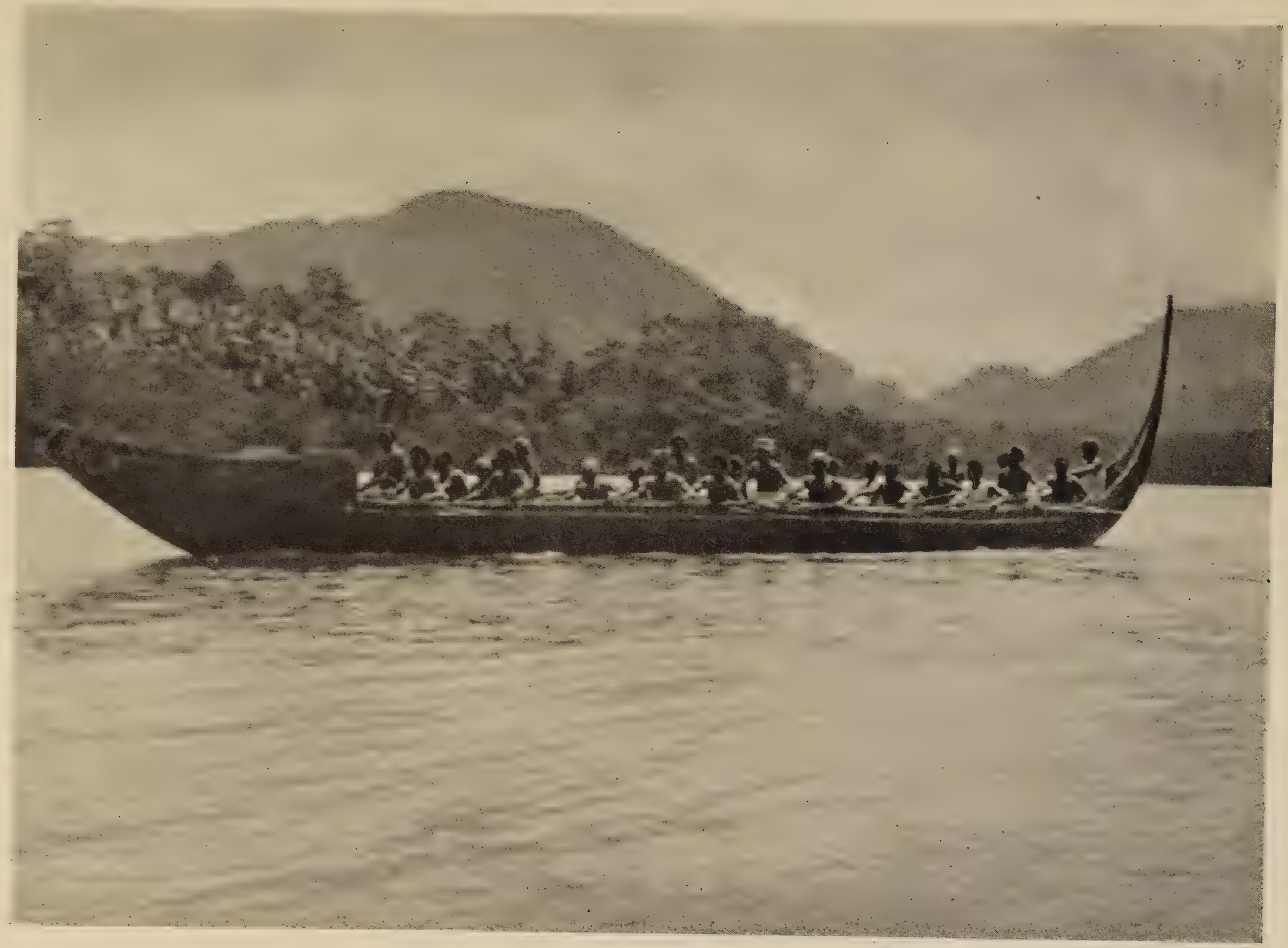
This is a very easy dance to learn and requires practically no inherited talent or especial skill to master. It might go in America if introduced for instance as the Tropic Wobble.

After the Wobble was over the banqueters rose from their benches and marched in a double file procession to the beach where they sat down to watch the children go in swimming. Presently two husky-looking men appeared carrying under their arms queer contraptions of bamboo. Several sticks had been tied together to form a raft about eighteen inches wide in the stern and pointed at the front. At the bow the bamboos were bent to curve up into the air like the nose of a toboggan. This point was nearly eight feet high.

We soon discovered that these queer craft were surf boards. The owners, sitting on the sterns with their feet hanging in the water, paddled out to the furthest line of breakers and then turned toward the shore. Instantly a large smooth roller came up behind them. Before it reached them they seized their paddles and got well under way. Then with magnificent daring they stood upright, skilfully balancing their flimsy rafts, and as the wave swept under them they pointed the bows downward at just the right angle to be propelled forward at thrilling speed—at least thirty miles an hour. It made a glorious picture as they came gliding into the bay with green and blue rollers all around them and white spray flying. Their dark skins were tawny in the brilliant sunlight and their bodies, silhouetted against the sea, were like bronze statues.

I have been unable to find any other trace of surf boards in the Solomons or elsewhere in the South Seas except Hawaii. Perhaps there is some undiscovered relationship in the histories of the two islands.

On April 19th, the day after our visit to Sowa, Captain and Mrs. Hill took Murry and me to a village about ten miles along the coast in the opposite direction. The purpose of our



THE BIGGEST WAR CANOE OF THE SOLOMONS

Photographed near Tunnibuli Bay, Ysabel Island

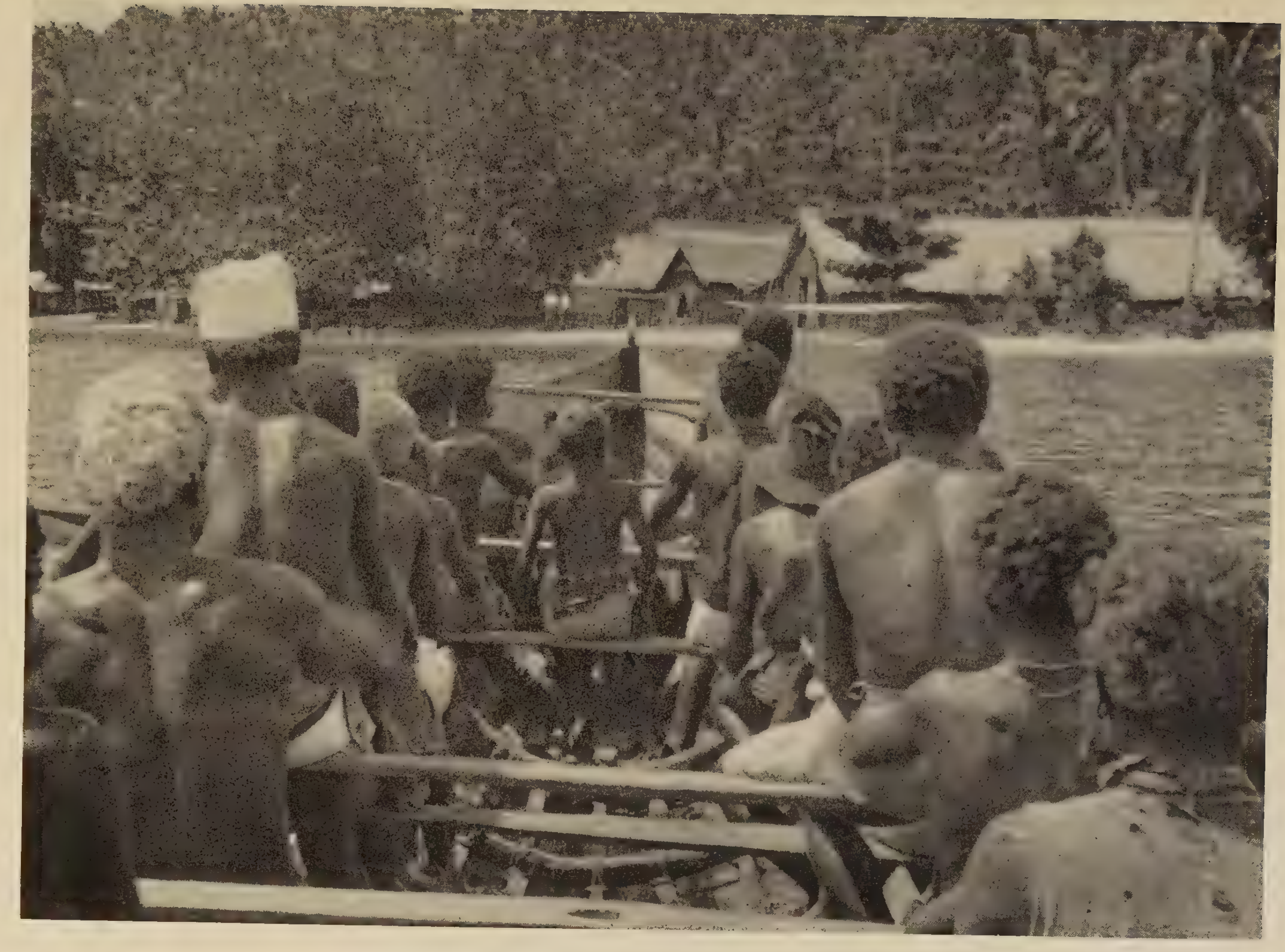
trip was to see a tremendous war canoe which the natives there had built. Captain Hill had told us it was the largest in the Solomons.

The village was on an island at the head of a bay and we ran the nose of the skiff onto a sandy beach behind which thirty or forty native houses were grouped in picturesque disorder. There were no men to be seen, though a crowd of women and children ran, excitedly laughing and shouting, to meet us. Upon inquiry the Captain learned that all the fathers and husbands had gone to work in the vegetable gardens on the mainland and would not return until sundown. This was discouraging for the great canoe could not be launched unless nearly every man of the village was there to help lift it. We sent a small boy as messenger to the men, promising them sticks of tobacco if they would return to the village at once.

While we waited we inspected a church which had been constructed by the natives entirely after their own notions and with their own materials, though no doubt they had derived the original idea from churches they had seen on other islands. It was a rectangular, one-story building about twenty-five by sixty feet in size and the pitched roof of thatch was supported by hand hewn rafters. The walls, over two feet thick, were built of a special kind of white cement which the natives make by pounding up pieces of coral and mixing the lime powder thus obtained with sand and water. The doors were each made of a single great slab of wood nearly three inches thick and the windows had substantial wooden shutters. There were many benches inside, facing a pulpit on a raised dais. All these things were made of hand-carved wood inlaid with mother-of-pearl. Even some of the roof timbers were ornamented with mother-of-pearl lettering. One set of letters was a date, another a man's name and a third a trade-mark of a well-known maker of canned beans. Apparently the letters were for decoration only—the meaning made no difference.

After more than an hour a few men began to straggle into the village. When about a dozen had arrived we were led to a canoe house nearly eighty feet long and twenty high, which stood close to the beach. When the swinging doors were thrown open we saw inside two colossal canoes. The larger was fully fifty feet long, five feet wide and three deep. The tailpiece at the stern curved gracefully up to a height of fifteen feet. Each of the bottom planks ran the whole length of the boat and had been carefully carved not only to fit perfectly against the adjoining pieces but also to reenforce the whole hull where strength was needed.

We were soon given a demonstration of the boat's speed and capacity. When about thirty-five men had arrived the chief called all the women to the boat house. Together they lifted the canoe from its supports and carried it to the shore, where it floated, empty, high upon the water. The women held it while the men returned to the boathouse for their long, pointed paddles. Then all thirty-five of the men took places in the canoe and pushed it off. At first they all shouted and yelled as they backed water in a disorderly fashion but after they had headed the bow away from the shore the chief stood up in the stern and uttered a sharp command. A sudden silence followed and then each man took one long slow stroke and three short quick ones. This maneuver was repeated three times, all the men paddling in unison and each one



This is the Canoe Which Is Said to Have Held 100 People

The planks are held to the ribs entirely with vine lashings

rattling the stem of his paddle against the side of the boat at the end of each stroke. The sound and general effect was the same as one of our eight-oar crews taking a racing start.

Once the boat had gotten well under way the paddlers settled down to an even stroke and increased their speed until I estimated they were making ten knots. Captain Hill told us that they can keep up that speed for many hours and sometimes make voyages of fifty or even a hundred miles to visit friends on other islands. He said that as many as one hundred men, women and children have been carried in this canoe at the same time and that it is very seaworthy.

The helmsman steered the canoe past us several times while I ground out some of the best movies secured on the whole trip. When he wished to turn about he gave a sharp command. In response the paddlers on one side backed water while those on the other side paddled full speed forward. At the same time the helmsman leaned on his steering paddle and the canoe spun around like a leaf in the wind.

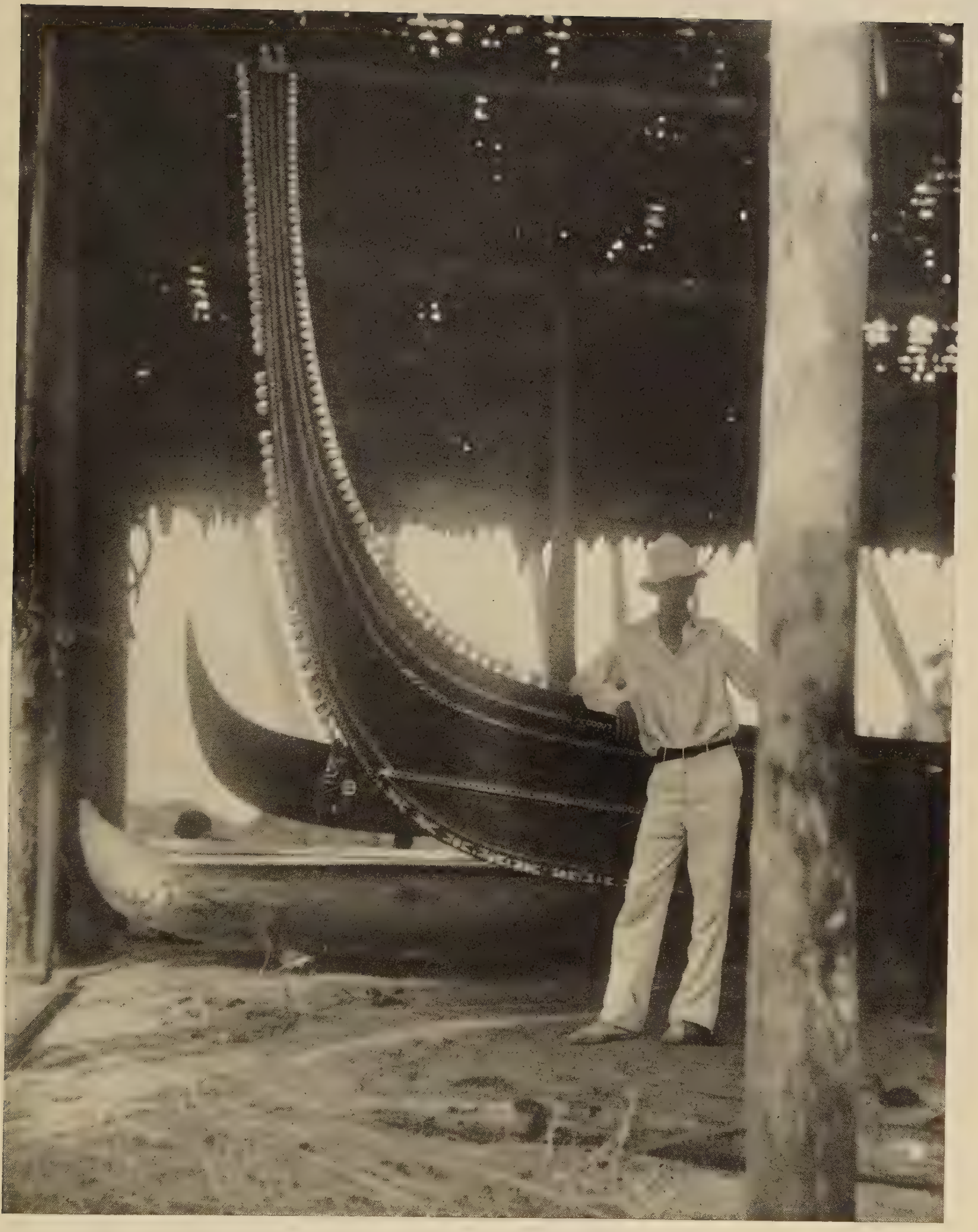
After taking all the pictures I wanted from the land I persuaded the chief to let me set up my camera in the stern of the canoe and go for a ride in it. We started off with the same racing stroke as before and in no time were speeding along at a great rate. So great was the impetus given by each stroke of the paddles that the whole boat moved along in jerks and I had considerable difficulty in keeping the camera from tipping. Finally steadying the tripod with my knee, I was able to secure some good views of the double row of paddlers and their sharp paddles which, on the recovery, flashed simultaneously in the bright sunlight.

We thanked the chief and his followers for their kindness in demonstrating their mighty canoe by the simple method of giving each one a "piecee tobacco." We also promised to send them some of the photographs. They were so delighted that we found it difficult to get away.

During the days when we had been visiting the native villages Schmidty and his associates had been busy with their scientific work, in which the Bignells supplied cordial aid. They found plenty to do not only because bird life was plentiful in the jungle but also because there are several rare species of snakes to be found in the Solomons. They collected small boas, tree snakes, and a poisonous terrestrial species known as *Denisonia.* A really remarkable find was a family of poisonous sea snakes which were captured at night in the water beside the ship. Perhaps I should add that only one snake was captured—a female. The rest appeared later.

The most valuable find scientifically speaking was a prehensile tailed lizard (*Corucia zebrata*) nearly two feet long. It had bony plates underlying the scales and a spotty green coloration which acted as camouflage. These lizards which belong to the skink family live together in nests usually located in hollow tree trunks. During the daytime they climb about in the trees where they feed on the leaves. When attacked *Corucia* flattens himself against a branch in such a manner that his protective coloration renders him almost invisible. Nevertheless the sharp-eyed natives find and eat him.

Schmidty was very pleased at being able to capture his *Corucia* alive, not only because he was able to observe the prehensile tail, a thing unusual among lizards, but also because this is one of the largest forms of skink in the world.



Cornelius Beside One of the Elaborately Ornamented War Canoes of the Rubiana Lagoon

A very large boathouse is needed to accommodate the tremendous prow

He kept it alive in a cage for nearly a month making observations and drawings.

On the evening of April 19th Dr. Moss joined us again, having come by launch all the way from Tulagi, a five hour trip. As soon as he was safely aboard we weighed anchor, waved goodbye to Captain and Mrs. Hill, and to Mr. and Mrs. Bignell, and headed the *Illyria* out to sea once again. Our destination was the Rubiana lagoon, a vast inlet at the western end of Ysabel, about twelve hours' cruise from Tunnibuli.

Our trip to the lagoon occupied the better part of three days but as much of it was repetition of what we had already done I shall not give too detailed an account of our activities.

We found living on a small island in the lagoon a well educated half-breed who had spent many years in Australia. He took us to several of the islands to show us some of the great war canoes for which the district is famous. None were as large as the one we had seen at Tunnibuli, but we saw several over forty feet long and of slightly different form. The bows as well as the sterns curved gracefully up to a height of nearly fifteen feet thus making the side view perfectly symmetrical. Another point of superiority of these canoes was that they were beautifully inlaid with mother-of-pearl designs and adorned with brilliant shells and carved figures.

"Until a few years ago the natives here worshipped their war canoes almost as gods," explained our half-breed friend. "They took such great pride and pains in the construction of these vessels that when a boat was at last finished it was customary to offer a human sacrifice before the maiden voyage.

A beautiful maiden was chosen for the offering. The theory was that the beauty of the girl must be tendered to the gods in return for the beauty bestowed by the gods on the canoe.

"Even today the most important event of the year is their annual canoe race. As many as fifty boats are brought from all parts of the lagoon to compete. If it were only to be held today you would be witness to the most beautiful and stirring sight of your lives."

When we returned from the lagoon to the *Illyria* we found the chief engineer standing on the lower yardarm, apparently about to jump off into the ocean. The crew had offered him $50 if he would make the leap but his courage failed him and after a long period of indecision he came down the way he had gone up.

The next day we set sail for New Britain, and on April 23rd arrived at the Shortland Islands, the most western of the Solomon group. The shore looked so uninteresting that no one landed except Cornelius and the Captain. When they returned a short while later they were accompanied by a customs officer who made us pay duty on all the food we had consumed on the *Illyria* while in the Solomon Islands although we had brought that food all the way from home ourselves! Yet they talk about "rackets" in Chicago!

CHAPTER IX

OVER THE JUNGLE

NEW BRITAIN is about three days' sail from the Shortland group. Although only a small island, it is important commercially and politically because of its strategic location at the intersection of three trade routes. Germany maintained a naval coaling station at Rabaul, the main port, until the World War, when Great Britain seized the island and confiscated all alien property.

We arrived at Rabaul on April 26th and anchored in the shadow of a great volcanic peak known as "the Mother." Customs officers came aboard, and soon had us entangled in the intricate British red tape with which we had already become familiar. We were not allowed to go ashore until the next morning.

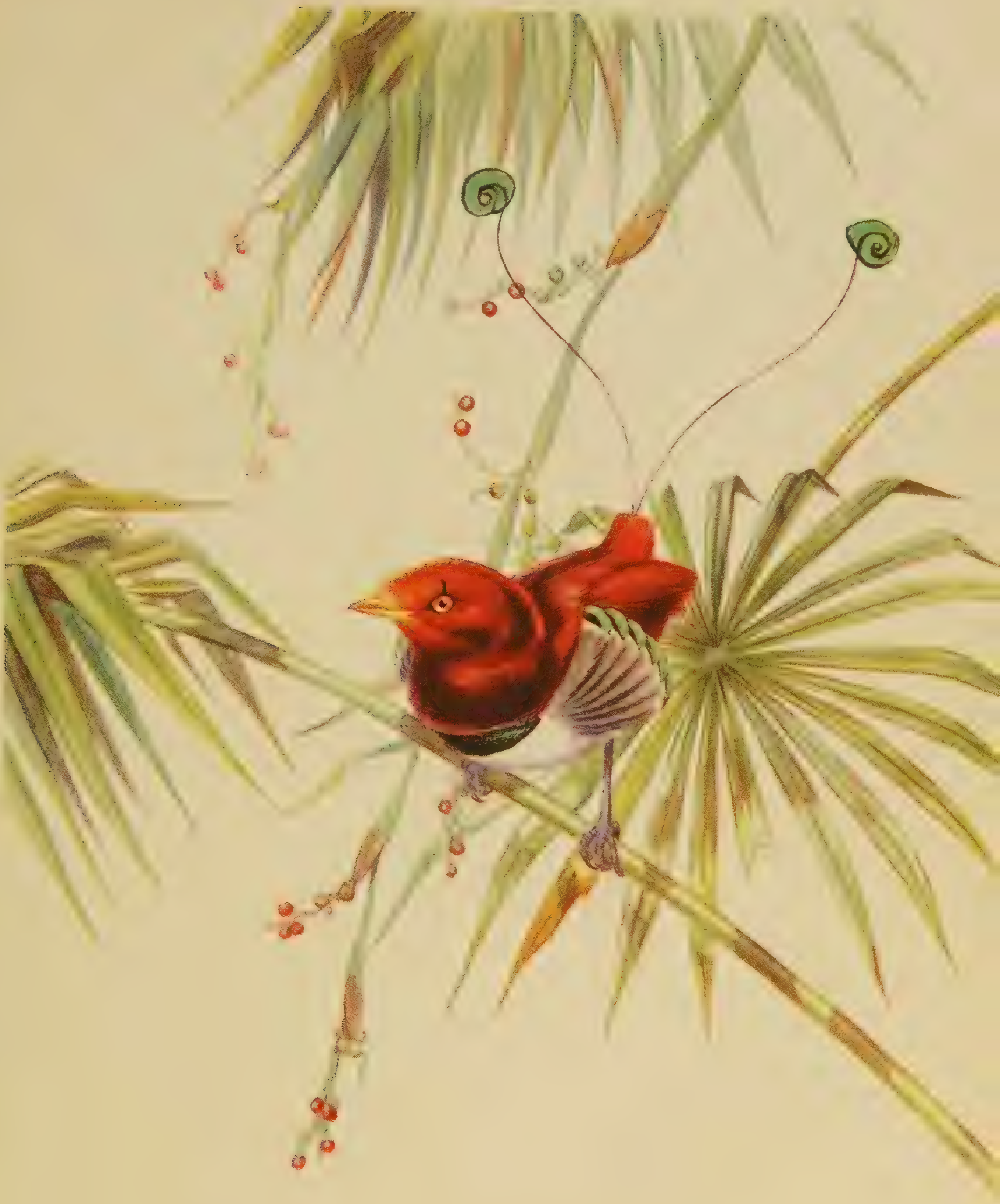
The Britishers at Rabaul were far more hospitable than at Fiji. Mr. Murray, a relative of Captain Boutilier, is the head of the department of agriculture in New Britain. He showed us about the city, pointing to the wide streets shaded with giant casuarina trees, to the imposing residences of the British officials and to the well built docks on the waterfront.

"These are all memorials to the German occupation," he said. "The city prospered under the Germans perhaps better than it does with us. Still, we are making progress in our own way."

New Britain is of great interest as one of the least known of the larger islands of the world. The only specimens Schmidty collected at Rabaul were birds and lizards shot with Mr. Murray's permission in the botanical gardens. We even found the half civilized natives prosaic, but we were not too much depressed by this dearth of scientific interest, as our purpose in coming had been purely practical. We needed to replenish our oil and food supplies and we wanted to secure first hand information on New Guinea. The former was easier to get than the latter. None of the Englishmen seemed to know much about New Guinea. Some had been to ports on the southern coast, a few had been to Madang on the north coast and one had been part way up the Sepik River. Yet their memories seemed to be a bit hazy and many of their stories were contradictory.

However, in the end, I was able to get most of the information we wanted through a strange coincidence. Two days before we were to leave Rabaul a small, rusty tramp steamer limped into the harbor. To us there was nothing strange in this occurrence, but the people on shore seemed very excited about it. Bells rang, whistles blew and flags were dipped.

"Hurrah!" they shouted. "It is our old friend the *Bremerhaven!* She was the last German ship to leave here



KING BIRD OF PARADISE
Cicinnurus regius similis [Stresemann]
New Guinea

before the war and now is the first to return. She is an omen of peace and returning prosperity."

The German residents in particular took the arrival of the *Bremerhaven* as an excuse for a great celebration. Her captain, Herr Koor, had been a friend of theirs in pre-war days. He invited them all to a party on board the ship, and through a complicated chain of events I was asked to come also.

When I arrived on board, just before midnight, everything was in tremendous confusion. The small dining saloon and tiny officers' quarters were crowded with fat Germans, tall Englishmen, wiry Australians, and women of all types and nationalities. They sat eight or ten at each small table drinking. Unobtrusive Chinese stewards glided back and forth bringing new supplies of champagne and beer for the thirsty crowd.

In spite of my uncouth beard I was treated as a guest of honor and led into the already overcrowded Captain's cabin. In the room were five Germans—drinking beer but very sober, and four Australians—drinking whiskey and quite drunk. Captain Koor himself made an eleventh. Although the room was so crowded that two of us had to stand up all the time, we remained nearly an hour, drinking "bottoms-up" to all kinds of silly toasts, inhaling an atmosphere of solid cigarette smoke and trying to understand each other's languages. (The Australians are nearly as hard to comprehend as the Germans.) Add to this confusion the fact that the crowd just outside the door were singing to the accompaniment of a very loud victrola and the fact that the *Bremerhaven's* crew were engaged in unloading long iron rods into a steel lighter. The well-known boiler factory was still as a tomb in comparison.

Presently one more man jammed his way into the hot, stuffy room—a tall, husky, red-faced, bull-necked German with an enormous forehead and close cropped hair.

"Mr. Soltweiser—Mr. Shurcliff," said Captain Koor by way of introduction. "Mr. Shurcliff is on his way to New Guinea."

"Ach! New Guinea!" exclaimed Soltweiser, nearly squeezing my hand to pulp. "Un ondresding coundry indeed! I vas dere fur dwelf yahrs meinself. I haf been to blaces vere no oder vite men haf ever been. I could dell you moch aboud it."

Up on the bridge where the night air was cooler and the crowd less noisy, Soltweiser and I held a long conversation.

During the war he was a fugitive from justice in New Guinea for three years. He told me his tale in his heavy dialect, which I do not transcribe.

"I never saw the ocean the whole time because I must jump from place to place in the interior to escape the English. For food I depended entirely on the natives, and unless I had known how to treat them they would have killed me.

"Sometimes I would have to approach, all by myself, a village where the natives had never seen a white man. If I came too close, they would climb on their roofs and shoot at me with their bows and arrows. Never but once did I shoot back. Always I did do this way—I would withdraw two or three kilometers and camp out. Then each day I would leave in a clearing a present for the natives, and each day I would move closer my camp to the village. After about three days I would be accepted as a friend."

For over an hour he told me graphic tales of outlandish

Photo by K. P. Schmidt and the author

Our First Sight of New Guinea

adventures. I did not even get a chance to enter a question edgewise until his stock of stories began to run low.

"How could we best see something of the interior of New Guinea?" I finally managed to ask. "We have neither the time nor the inclination to make a regular land expedition, but we have a fine yacht at our disposal. How far up the Sepik River could we go by boat?"

"No one knows how far you can go up the Sepik," he answered. "It all depends on the height of the water. But for me," he continued, "I would go into the interior by airplane if I were you. That would be much quicker."

"Yes, but where will the airplane come from?" I queried. "We haven't seen one since we left Panama."

"That's easy," he rumbled, "there is a flying field near Salamaura. The gold miners use planes to fly to the gold fields at Wau and Edie Creek. Simply sail the yacht to the field, engage a plane and go anywhere you want."

Fly over New Guinea! Why not? Bidding a hasty good-night to Soltweiser and his friends, I rushed back to the *Illyria* and woke up Cornelius to communicate the good news.

"Great stuff!" he said. "We'll go to Salamaura if we can possibly arrange it and maybe up the Sepik River, too. I'll investigate further in the morning."

So, to shorten a long story, we decided after conferring again with the British officials that both projects were feasible. We left Rabaul on May 2nd and after a rough passage of two days anchored off Lae Flying Field—a mere jungle clearing on the seacoast about eighteen miles southeast of Salamaura.

Before we could get a small boat overboard a large plane, flying low, came out from the field and circled twice around us. This looked like business, so we lost no time in going ashore, although we had to land on an unprotected beach upon which the surf beat with considerable violence. At the water's edge we were met by a tall, sunburned Englishman, who had driven a very battered Dodge car onto the beach.

"Welcome to Lae, gentlemen," he said. "My name is Taylor—I'm a partner in one of the air service companies here. Can't I give you a lift to the field?"

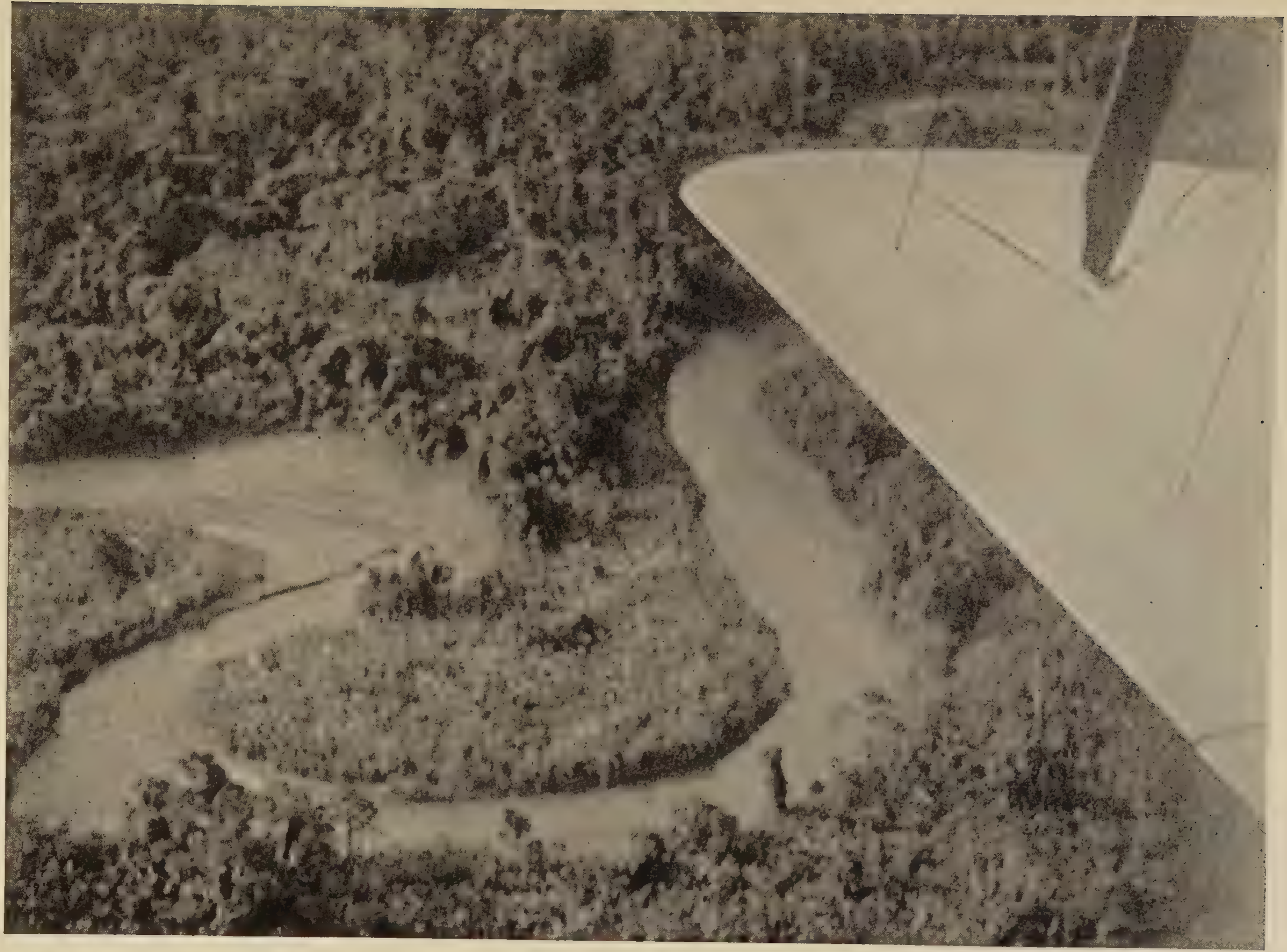
"You bet! We never walk when we can ride."

The field was simply a level stretch of land about three thousand feet long, which had been cleared of trees and stumps. Along one side were ranged half a dozen "hangars"—rough frame shacks with straw roofs designed more to offer shelter from sun than rain—and a few tumble-down dwelling houses. We could see ten or twelve large modern airplanes, some on the field and some in the hangars. A few white men and several native police boys were working on two of the planes.

"Lae field is less than three years old," explained Taylor. "The only reason for its existence is that it is the nearest spot on the sea coast to the recently discovered gold region near Wau and Edie Creek. Although the gold fields are only 120 miles away, seven days' hard marching through the jungle are required to get there on foot, and water travel is quite impossible. Yet by plane we can make the journey comfortably and easily in seventy minutes."

"What do you charge to take a passenger to Edie Creek?" asked Cornelius.

"Twenty-five pounds per person each way and a shilling an ounce for luggage," said Taylor. "That may seem like a lot when compared to rates in the States, but our expenses



Over the Jungles of the Markham River Valley

here are much greater. The miners make at least $300 a day apiece, so the cost of transportation does not worry them much, anyway. All twelve of the planes here are kept in constant use, the demand for them is so great. Even food, clothing and mining machinery must go inland by air."

"What do you do when you have to make a forced landing?" asked Murry, looking off toward the cloud capped mountains which bounded the narrow river valley on which the field was located.

"We come down in the river," answered Taylor briefly. "Three men have done it already. They weren't hurt, but their machines are still where they landed. Luckily for us, none of the three planes belong to our company."

"Well," said Cornelius, turning to us, "we came to fly. The planes are here, the pilots are ready and the weather is good. Why waste time? Let's charter this four passenger De Haviland for a hundred mile trip over the jungles and let's go now! Chuck, you can come and Sid, you also. Murry can go up in the little Moth at the same time if he wants to. Can you arrange that, Mr. Taylor?"

"Right-o," said Taylor. "The two planes will be ready in twenty minutes."

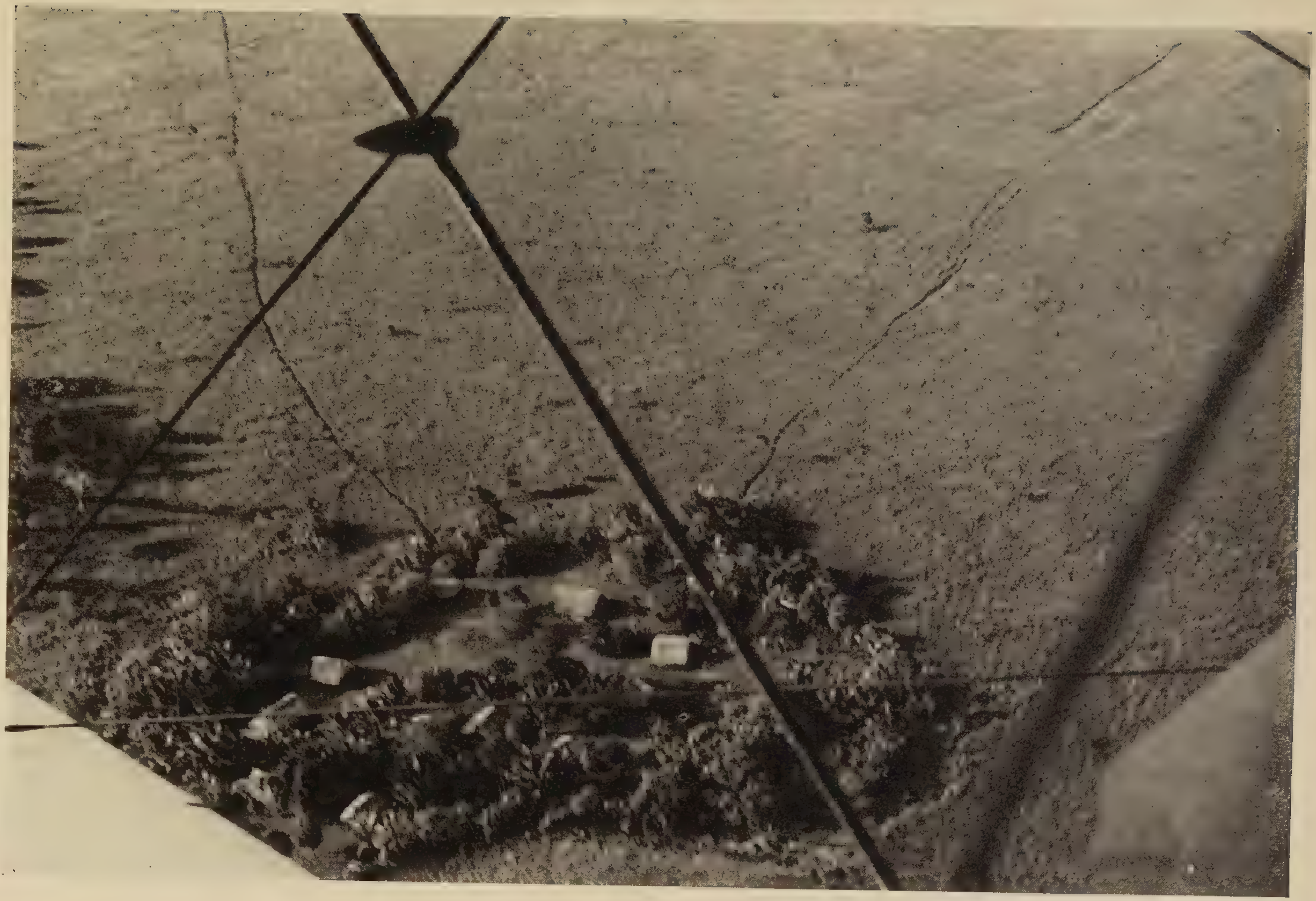
I rushed back to the *Illyria* for the two automatic movie cameras and the Graflex still-camera. Chuck went with me to collect sweaters and goggles.

When we returned to the field the big plane was ready to start and the motor was already running. We rushed to the scales for a hasty check of our weight and then climbed into our seats. Although a little too heavy for the best possible balance, I was assigned the photographer's cockpit in the tail of the plane. My knees were wedged against Cornelius' back and Chuck had a larger seat in front of the pilot. Even before I had time to tie on my goggles we had taxied to the runway, turned, and were off with a deafening roar.

We were headed straight for the ocean, but before we reached the shore the ground below us seemed to drop away. Out over the blue sea we dashed, easily clearing the tall masts of the *Illyria,* then spiralling twice to gain altitude, we were off along the coast toward Salamaura.

What unbelievable beauty! What exaltation of body and spirit! Although it was my first flight, I knew from the instant we left the ground that I was going to like it. The ocean which had seemed rough and muddy from our skiff appeared from the plane as a great expanse of dark blue, the surface ruffled only by the tiniest of wavelets. A few gray splotches indicated submerged reefs and a winding white band roughly parallel to the shore clearly marked the line where the barrier reef tripped up the rollers.

Another band, a yellow one at the edge of the blue sea, was the beach. Behind it stretched miles and miles of dense jungle—the forest roof appearing like soft green moss. This green background was marked only by the curious meanderings of a muddy river which, flowing from the mountains beyond, had lost its speed and ran sluggishly in innumerable oxbows. Behind its glittering pattern rose the mountains—blue and steep—rearing their cloud capped summits above us in our plane. And still higher up—over everything—was the intense blue dome of the sky. The beauty of the sunset at Moorea had lain in dramatic silhouettes and pastel colorings. The beauty of New Guinea from the air was more tangible.



A Village in the Markham River Valley Near Lae Flying Field, New Guinea

Footpaths can be seen winding through the long grass of the marshlands

The colors were more intense, the microscopic details more sharply defined. It was the difference between emotionalism and realism.

While I was thinking philosophically I found myself acting very practically. Having three cameras to contend with in one small cockpit was no easy task, especially since whenever I raised a camera above the fuselage to take a picture the wind nearly wrested it from my grasp. To make matters worse my shirt had blown off, leaving me half naked and very much exposed to the hot wind. Nor had I been able to put on my goggles. Everything was rather hectic for a time.

It seemed only a few seconds before we reached Salamaura—a little village set on a long narrow isthmus which connects the mainland with a small island. As our pilot spiralled down in response to my signal that we wanted a closer view, I had a glimpse of red roofs, bleached wooden piers and a pattern of roads and paths. A few tiny dots must have been human beings.

Hardly had Salamaura registered itself on our minds than it began to slide into the distance as we turned back toward the field. In a few minutes we passed mile high over the *Illyria* again and soon we were speeding inland up the Markham River valley at a hundred miles an hour. At its mouth the river ran wide and fairly straight along a level plain, but after ten miles we found it meandering and splitting up into several little streams. Crowding up to its banks and even overhanging the water was the tropical forest—no doubt dense and forbidding to those who are caught in it, but from the air merely resembling green cotton wool.

Still further upstream the river ran between low rounded hills, some of which were entirely bare of trees. In the bare areas grew long yellow-green grass, which made the ground seem extraordinarily smooth and soft. In a hollow between some of these hills was an azure blue lake, perhaps two miles across, which shone like some beautiful jewel of enormous proportions.

Another few minutes brought us over marshy lowlands, where green clumps of trees alternated with irregular areas of gray marsh. As we soared over this area our pilot motioned to Cornelius and at the same time began to circle down. Peering over the side I saw a little toy native village with neat thatched houses of tiny proportions. As we came closer I realized that it was a real village and hauled out my camera just in time to get a good view of it. The inhabitants came rushing out of their houses to see what all the noise was about, and then rushed in again—apparently very much frightened.

As we turned homeward the air became rough, and our plane, which had been steady enough over the ocean, lurched and rocked in alarming fashion. However, our pilot did not seem at all disturbed.

Presently I discovered that we were over the hangars again. Before I had had time to consider the matter we began a long swirling drop like a sudden descent in a revolving elevator. The flying field turned up on its side and the sea threatened to spill out into the land. Just as I thought we must crash into the earth we flattened out and shot straight out to sea, twice encircling the *Illyria* at an elevation no greater than that of her cross-trees. Then with another swoop we returned to the field and gently landed. Our marvelous flight was over.

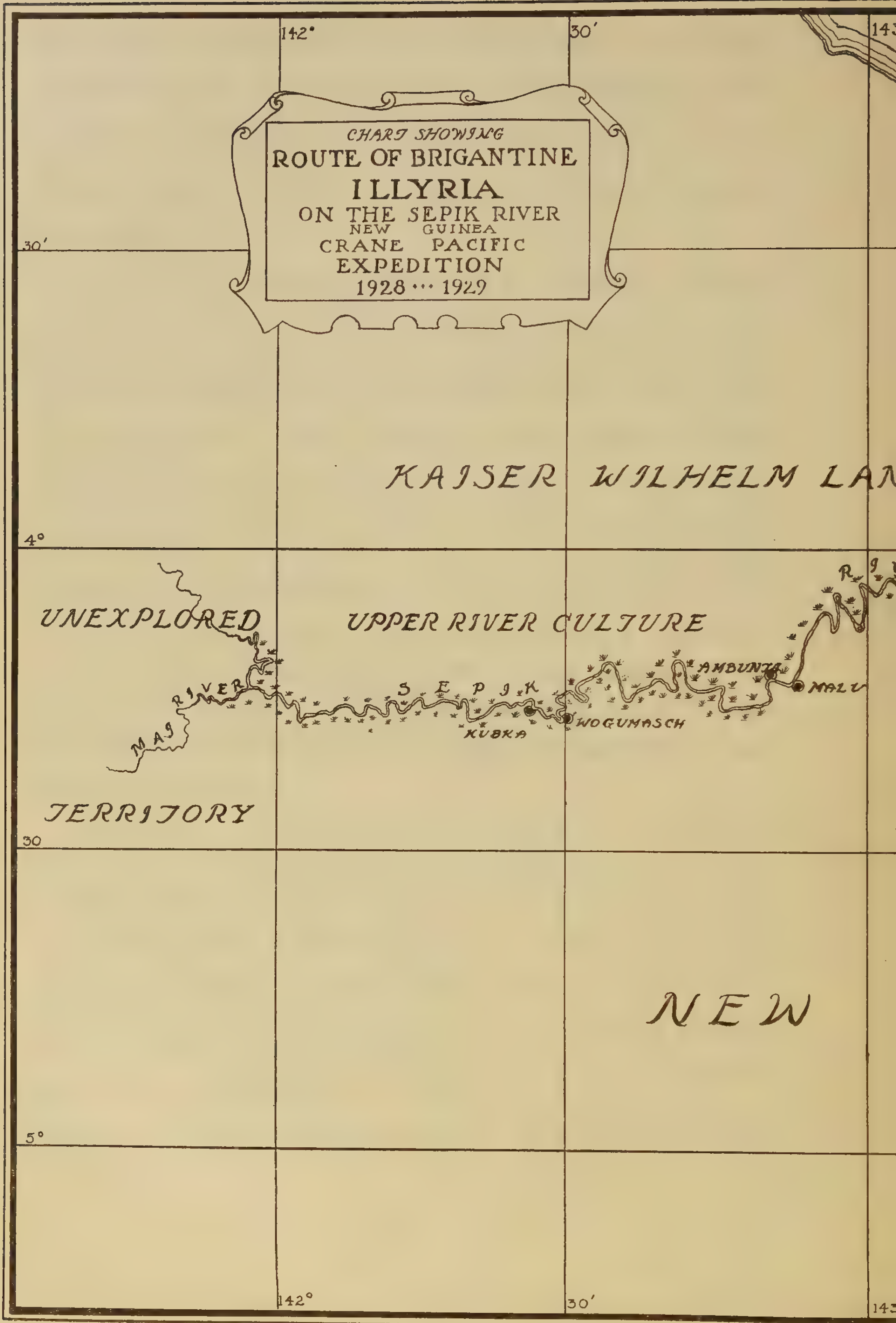
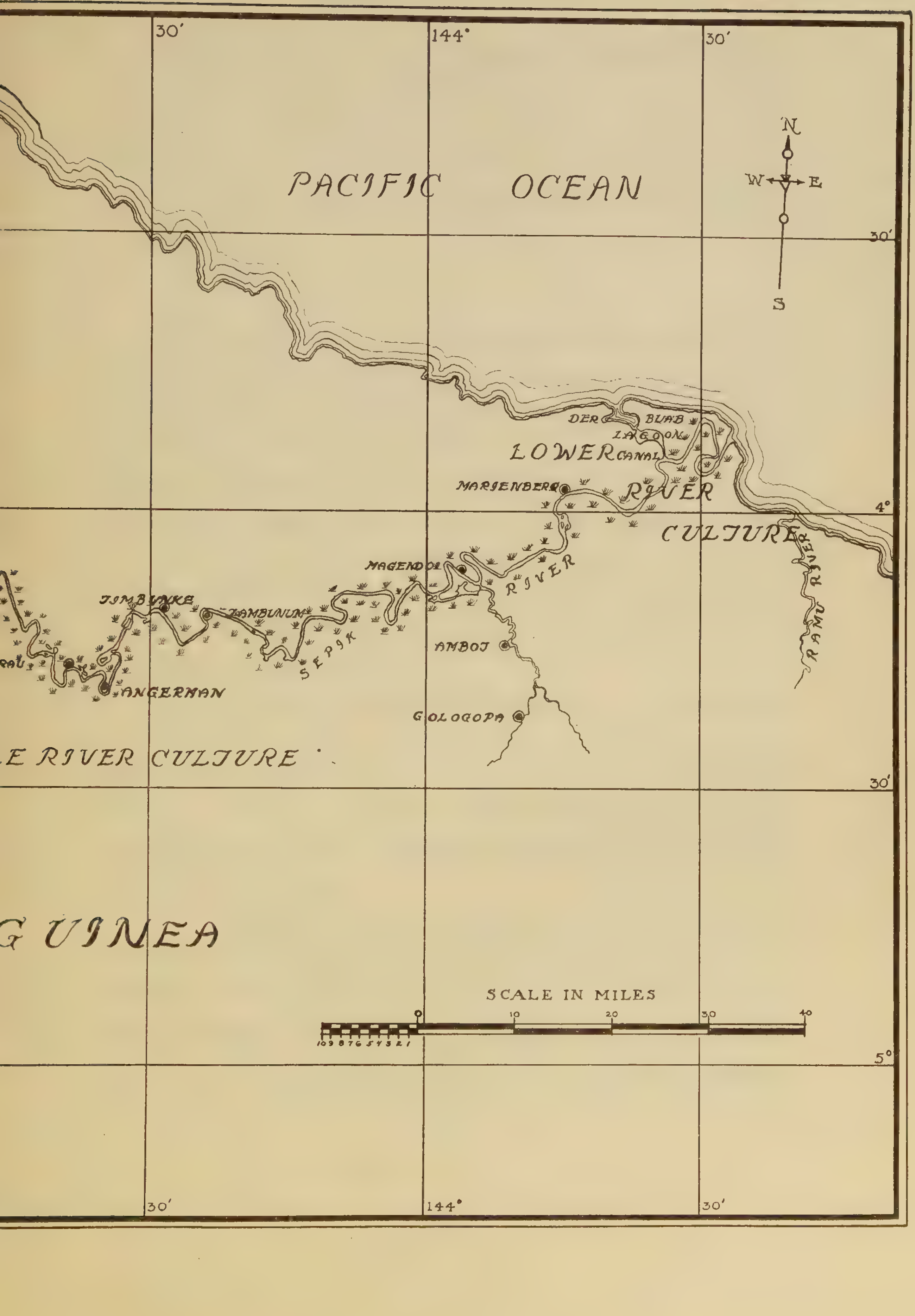


CHART SHOWING
ROUTE OF BRIGANTINE
ILLYRIA
ON THE SEPIK RIVER
NEW GUINEA
CRANE PACIFIC
EXPEDITION
1928 ··· 1929
142°
30′
14
30′
4°
30
5°
KAISER WILHELM LA
UNEXPLORED
UPPER RIVER CULTURE
MAI RIVER
SEPIK
AMBUNTI
MALU
WOGUMASCH
KUBKA
TERRITORY
NEW



30'
144°
30'
PACIFIC OCEAN
N
W
E
S
30'
DER
BUAB
LAGOON
LOWER
CANAL
MARIENBERG
RIVER
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4°
RAMU RIVER
MAGENDOI
RIVER
TIMBUNKE
TAMBUNUM
SEPIK
AMBOI
GOLOGOPA
RAU
ANGERMAN
E RIVER CULTURE
30'
GUINEA
SCALE IN MILES
10 9 8 7 6 5 4 3 2 1
0
10
20
30
40
5°
30'
144°
30'

"Gee! but that was great!" exclaimed Cornelius when we landed, but after he had paid the bill for the plane he was less enthusiastic. "They charged me for an hour and a half flying time," he said. "If it had been three hours I should have had to give them the *Illyria,* too. Let's leave before we are tempted to go up again!"

So we did.

. . . .

The Sepik is the largest and longest river flowing toward the northern coast of New Guinea—a coast over 1500 miles long. The entire course of the river falls within the geographical division of the island known as the Territory of New Guinea, which was Kaiser Wilhelm Land, until the Great War. The upper reaches of the river were sketchily mapped by a German scientific expedition which made an extended survey in 1913. Aside from the relatively small amount of country which they explored, the entire "Upper River" region is unknown to white men.

It was this very wildness which appealed to our adventurous spirits. We wanted to explore this mysterious virgin territory—to have unforeseen adventures and to discover unknown men and animals. Soltweiser's stories still rang in our ears and raced in our blood. Everyone was agreed; the *Illyria* was to cruise up the Sepik.

But we were also determined not to be foolhardy. We knew that of many inland expeditions which had been attempted in other parts of New Guinea, only two or three had been at all successful. We knew that many an adventurer had succumbed to the tropical diseases of the pestilential jungles and swamps. And we knew that we were quite ignorant of native languages and customs in the interior. Obviously we needed an experienced man to advise us.

Soltweiser had mentioned a Father Kirschbaum. The Governor-General of New Britain had recommended Father Kirschbaum. And at Lae Flying Field they had praised Father Kirschbaum. That he would be the best man to help us was an obvious conclusion. We set off in search of him.

Two days after leaving Lae we arrived at Madang, an uninteresting little town located on the coast about fifty miles east of the mouth of the Sepik. On shore we asked for Father Kirschbaum. "Oh, yes," they said. "A fine man—a great anthropologist and a capable missionary. Without doubt you can find him at Marienberg, his little settlement on the lower Sepik, or possibly at the big Catholic Mission at Alexishaven.

Since the big mission was only ten miles away we decided to go there first. Our choice was lucky. Father Kirschbaum had come down from Marienberg for supplies and was nearly ready to return when we arrived. He was a strong, thickset man of middle age. His face was partially concealed by a neatly clipped black beard, but his kindly eyes, which twinkled behind silver rimmed glasses, his understanding smile and his hearty laugh were sufficient evidence that we had to deal with a man of high intelligence, education and wit. He spoke very good English, although with a slight German accent.

Cornelius and Schmidty drew him to one side and the three talked earnestly together for a long time. The rest of us waited hopefully, though a little apprehensively, for them to come to a decision. Finally they all shook hands, slapped each other on the back and rejoined us.

Father Kirschbaum, the German Missionary who Facilitated Our Trip up the Sepik River, New Guinea

"Everything is settled," announced Cornelius. "The Father will go with us up the river as far as we are to go and will aid us in every way he can. In return for this favor we are to help him by transporting from here to Marienberg three tons of provisions and fifteen natives, though of course that won't even the score. The stores will go on board tonight and we shall be ready to start tomorrow morning at daylight."

However, we were unexpectedly delayed one day by the necessity of taking the second mate back to Madang, where he could receive expert medical treatment for his throat, which showed signs of renewed infection.

On May 9th, everything being in readiness, we entered the Sepik and started on our long journey to the interior. Near its mouth the river was over half a mile wide and very crooked. The water, yellow with clay and mud and congested with tree trunks and floating grass islands, was plainly at flood height, for the river had overflowed its banks in many places. The current also was unusually swift, the average speed being about three knots. At nearly every bend we encountered great whirlpools and unforeseen eddies.

Nevertheless we had little difficulty in making progress upstream, for Father Kirschbaum, who knew the channel well, spent the whole day on the bridge directing the helmsman and even lending a hand at the wheel when it was necessary to avoid snags or floating tree trunks.

On each side of the river was flat, swampy country, overgrown with dense jungle, which stretched away in all directions as far as the eye could reach. Even from the crow's nest the nearest high land we could distinguish seemed to be nearly a hundred miles away. We could well believe the warnings we had heard about the hordes of mosquitoes which descend at dusk upon all travellers on the river. The steward spent most of the day repairing and installing fly screens and mosquito nettings.

At first we saw only a few native canoes. They were all of the dugout variety, but were longer and narrower than any we had encountered before. The bow of each one was carved to represent a crocodile head and the stern tapered away in semblance of the tail of that reptile. Near the center was carried a cocoanut shell brazier in which charcoal embers were kept constantly burning. It was amusing to see the smoke curling up from the bottom of the boat.

The natives paddled standing up, a trick which we had not seen before. Since the canoes were not over a foot wide and were not equipped with outriggers, a marvelous sense of balance is required to keep them right side up. The paddles were carved from some kind of very hard wood which resembled teak and were about nine feet in length. Although strong, they were quite light.

About four o'clock Father Kirschbaum pointed out to us a small village half hidden in the jungle on the left bank of the river.

"That is Bien," he said. "Rather a typical village of the 'Salt-Water' culture. This Lower River culture is quite different from what we shall find on the 'Middle River,' and 'Upper River.' If you care to go ashore I think you will find it interesting."

We anchored without much difficulty, but the swift current rushing past made it seem as if we were still moving at about half speed and we had considerable difficulty in holding the

Captain Boutilier with an Impromptu Harem at Bien

skiff while we got into it. Subsequently we had to adopt the practice of running the motor of the launch all the time it was being loaded in order to keep it from crushing the gang plank.

We found Bien very interesting. The natives, both men and women, who had lined the river bank at our approach, laughed and giggled at the unusual sound of our outboard motor and at our rather clumsy efforts to get ashore. They were very friendly and out of curiosity followed us as we inspected their houses. The latter were long, narrow, thatched structures set on tall posts which had been driven into the ground strongly enough to resist any possible overflow of the river and in front of each house was an uncovered platform on which the whole family was wont to sit at meals and during their spare time. Of this latter they seemed to have a great deal.

The inhabitants had very distinct Papuan characteristics—long heads, flat noses, short, kinky hair and dark brown rather than black skins. The heads of the women were masculine in appearance and not in the least attractive. Their hair was so closely clipped as to leave them almost bald, while the men's locks were fashioned into tall cylindrical head-dresses elaborately bedecked with shells. For clothing the men wore only loin cloths, the women short skirts of dried grass and the children nothing at all. Whenever we tried to approach nearer than about twenty feet from a woman she would turn and run away. This was rather inconvenient from a photographic point of view, but Father Kirschbaum settled the difficulty by asking the chief to command the women to pose for us. We finally got them all to form a long line, and then put Captain Boutilier in the center for contrast.

After we had looked about for a while Father Kirschbaum intimated to the chief that we might be willing to purchase some trinkets. At once all the women scurried off into their houses and soon returned with all kinds of carved wooden images, drums, shields, etc., which they handed to the men to show us. Some of the human images were life size, but so hideously distorted and so garishly colored that we did not buy any However, we did purchase for a few shillings some smaller images, also very much distorted, and some cylindrical hand drums about two feet long which had been carved from a single piece of hard wood, laboriously hollowed out and capped with lizard skins. Father Kirschbaum assured us that the natives needed the money to pay the annual tax which the English government collects wherever possible in New Guinea as in the Solomons.

Darkness soon overtook us and with it came the much dreaded mosquitoes. We beat a hasty retreat to the *Illyria,* where, sheltered behind the mosquito nettings, we took double our regular doses of quinine. After supper Father Kirschbaum had a suggestion to make.

"We are anchored nearly opposite an artificial canal which connects the Sepik with an inland lagoon," he said. "The lagoon is about fifteen miles long and at the further end drains out into the ocean, near a 'Salt-Water' village called Der Buab. The inhabitants of Der Buab are much more primitive than the natives we have seen today, for white men very seldom go there. If you have the time to spare we could take the whole day tomorrow for a visit. I think you would like it."

Every one agreed to his scheme. We arose shortly after daylight the next morning, snatched a hasty breakfast and

Schmidty on Friendly Terms with a Marsupial Cuscus

piled guns, cameras and supplies into the big motor launch. But the big motor launch did not seem so big after we had crowded in. There were nine of us; all our party (except Walt and Frank), Father Kirschbaum and one of the fifteen native "boys" who had been sleeping on deck. The last named was supposed to act as a pilot, since he had been to Der Buab before. When we had all climbed into the launch she was loaded to full capacity.

We easily found the mouth of the little canal. It had been dug by the natives, according to Father Kirschbaum, in order to establish a water connection with the lagoon. It was about two miles long, but only about ten feet wide. We ran into the bank at nearly every corner and also hit on several submerged logs—luckily with little damage to the boat. The jungle on each bank overhung the water to such an extent that part of the time we seemed to be going through a mysterious tunnel in the heart of the forest.

Finally the canal began to widen out and of a sudden, on rounding a bend, we came out into the brilliant sunshine of the lagoon. After that the navigating was easy. We ran at full speed for about two hours, ploughing from one jungle-bordered reach of water to the next with monotonous regularity. Before long all of us with the exception of the pilot were thoroughly lost. I doubt whether any of us could have found the way back.

Then a vista appeared between two groups of mangrove trees on our right and looking down it we could see the waters of the lagoon racing through a tide rip into white breakers and blue sea.

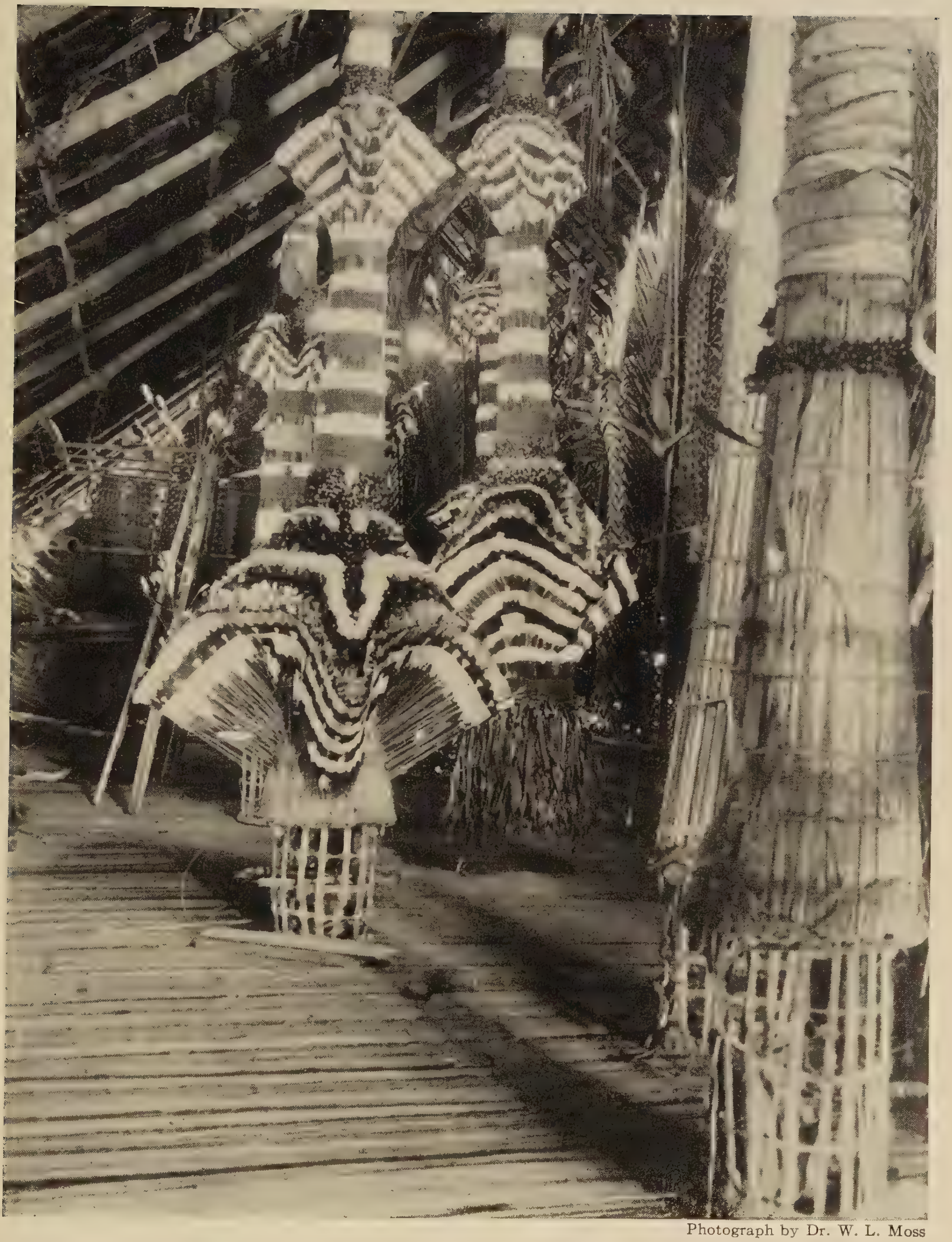
"Look there on the further shore of the inlet!" said Father

Kirschbaum. "It is Der Buab. You can see the long roofs of the clubhouses."

Just at that instant the motor spluttered and stopped. Murry, who was at the wheel, pressed on the self-starter button and the engine started again almost at once, so that we reached the village without any difficulty. Yet later events proved that we were foolhardy in disregarding this warning.

The houses at Der Buab, like those at Bien, were set on piles, but differed from them by being longer and higher and also in having the gables carried out to a sharp point or prow which overhung the outdoor eating platforms. Father Kirschbaum explained that this queer shape has religious significance. The main part of the house represents the body of a crocodile or "puk-puk," as the natives call them, and the overhanging prow symbolizes the head of that animal with mouth wide open. At Ambot, a village which we visited later on, the natives had carried the characterization even further by tapering the buildings off at the back to represent the long tail of the reptile.

The people of Der Buab were rather surprised to see us, but lost no time in bringing out bows and arrows, drums and all kinds of small images for sale. Apparently they, too, dreaded the coming of the tax collectors, for they were willing to take silver as well as trade goods in exchange. Both men and women were moderately good physical specimens, but they could scarcely have been called attractive. Two or three of the older women seemed to be in mourning, for they had smeared themselves with red clay and wood ashes until they were quite horrible to look at. The Father explained that it was part of the ceremony for them not to look at any man



Photograph by Dr. W. L. Moss

CEREMONIAL HEAD-DRESSES FOR THE TRIBAL DANCE; IN THE MEN'S CLUBHOUSE AT DER BUAB

during the mourning period, but we caught them snatching quick glances at us when they thought no one was watching.

After we had spent about half an hour in the village Father Kirschbaum came dashing out of one of the clubhouses with the light of discovery in his eye. "Come in here," he said. "I have found something very interesting. They are manufacturing head-dresses for the next dance."

We climbed the rickety driftwood ladder which led to the interior of the clubhouse through a hole in the bamboo floor. There behind a long screen of braided palm leaves we saw six of the most remarkable head-dresses I have ever imagined. They were at least twelve feet high and seemed to be made entirely of brilliantly colored feathers, affixed in such a way as to form various geometrical designs and patterns. In the bottom of each one was a hole about the size of a man's head, so that the weight could be carried on the shoulders. Opposite the point where the head of the wearer would be placed was affixed a very large grotesque wooden mask with mother-of-pearl eyeballs. Above the mask was a great swelling of feathers which tapered off near the top into a long column which carried at its upper end a ball and tassel. The method of construction was very ingenious, each feather being tied to a short bamboo arrow which was then stuck into a wooden core in the center.

Four or five men who had been working on the masks ceased their labors when we entered and nothing we could do would make them continue.

"These head-dresses are very sacred," explained Father Kirschbaum. "They are worn only once—at the funeral of a chief. They are so difficult to construct that it takes two or three years to finish them, and during all that time no woman is allowed to look upon them. When the day of the funeral finally comes—it may be years after the death of the chief—the head-dresses are worn for just one night. The next day they are all burnt up in order to appease the chief's spirit."

After spending another hour in wandering about the village and making a few more purchases we loaded everything into the launch, waved goodbye to the natives and started back to the *Illyria.* The motor functioned well and we made good progress through the lagoon until we got about nine-tenths of the way across the mouth of the outlet. Then came the first intimation of trouble. The motor slowed down, gave several feeble coughs and stopped. Murry made ineffectual attempts to start it again.

"Throw over the anchor at once," said Father Kirschbaum excitedly. "Otherwise the swift current will carry us through the outlet into the breakers."

Cornelius and Chuck worked frantically to get out the anchor and rope from under a pile of bows, arrows, drums and wooden images, but by the time they cast it overboard we had drifted into that part of the outlet where the current was the swiftest. The anchor rope paid out to its full length almost smoking as it tore through the bits, but when the end of the rope was reached we drifted along just as fast as before; either the anchor did not reach bottom or it did not hold.

The situation began to look bad. The sea was breaking nearly all the way across the mouth of the outlet, and though there seemed to be one fairly smooth channel in the center, we were drifting away from it toward the worst rollers. It was obvious that a boat as heavily loaded as ours could not live

Photo by M. N. Fairbank

THE AUTHOR (SOMEWHAT DISGUISED)

With the Expedition's motion picture camera

through them. Father Kirschbaum began looking under the seats for life preservers.

Murry and I struggled with the motor, and soon found that although the gasoline tank was half full of gasoline, it was not getting through to the carburetor. The electric gasoline pump seemed to be working so we decided there must be some dirt in the feed line which had caused the stoppage. There was no time to take the feed line all apart to clean it but Murry thought of a trick which might help.

"Put your mouth down to the opening in the gas tank and blow as hard as you can!" he shouted to Schmidty who was nearest to the tank. "Perhaps the extra pressure will make a difference."

Schmidty bent over, put his mouth to the dirty opening into the tank and blew till his face was red and his eyes almost popped out. The boat began to pitch about considerably throwing gasoline into his mouth and all over his face but he stuck to the job. Murry pressed on the starter. Whirr! We were off.

Cornelius and Chuck hauled up the anchor as Murry steered the boat about and we all heaved a sigh of relief as we started upstream. Schmidty and I took turns at blowing into the gas tank and all seemed to be going well. We headed for the nearest bank of the inlet, rather than risk going all the way up into the lagoon again, and were within twenty-five feet of the shore when the motor faltered and died again.

Some natives had come running along the shore to help us and one of them had already arrived within a stone's throw. Father Kirschbaum heaved the loosed end of the anchor rope ashore and the foremost native seized it. We were already drifting away, for the current was moving at a rate swifter than five knots. The native exerted all his strength on the rope, but he could not check us. Slowly he was pulled into the water—up to his knees—his waist. He had to let go. We drifted out toward the breakers once more, having missed safety by a tantalizing margin.

"Get him big feller war-canoe" shouted Father Kirschbaum to the natives. "Maybe you feller pull white man's boat along shore."

The natives rushed for their canoe and we drifted faster and faster toward the breakers.

"Blowing won't do any good now," said Murry calmly. "I'll have to take the gas line off and clean it."

He crawled into the bilge to unfasten one end and I disconnected the other at the motor. By the time we got it off we were within three hundred yards of the danger line again.

I looked over the rail and to my surprise and joy saw bearing down on us a long, narrow war-canoe with ten men in it, all standing up and paddling as hard as they could. Father Kirschbaum threw the loose end of the anchor rope to the nearest man who by sheer sleight-of-hand managed to catch and hold it. The natives swung their canoe around and heading upstream paddled with might and main for the shore, for we were now a quarter of a mile out to sea. The rope grew taut and nearly pulled the last man out of the canoe but we continued drifting toward the danger zone as fast as before.

For perhaps sixty seconds the natives struggled at their paddles. Even at that hectic moment I could appreciate the beautiful picture they made, all working in unison, silhouetted against the yellow beach and intense blue sky. Then they looked back, and with one accord they shrieked with terror. We had dragged them right into the breakers. They cast off the rope and paddled madly for shore, leaving us to our fate.

"Mein Gott! We are lost now!" exclaimed Father Kirschbaum. "We couldn't even swim ashore in this current."

"Can you swim anyway?" I asked him.

He shook his head slowly, but at the same time put his finger to his lips so that I should not worry the others by telling them. A brave man in the face of danger—Father Kirschbaum.

The little launch began to pitch and roll. Water came in over the rail. The situation was bad and getting worse.

"Quick!" said Murry to me, "help me put the gas line on again. I think I have it cleaned out."

He crawled down into the bilge again to couple up his end of the line but I had no wrench to use on my end.

"Well, men," said Dr. Moss, "if we don't get 'bow on' to this next big roller we're going over."

Murry and I snatched one glance at the oncoming wall of water which threatened to dash down on us from a height well above the horizon.

"My God!" shouted Murry to me. "No time to tighten that connection. Hold it in place with your hand, Sid!"

I lay down on my back with my head in the bilge and held the gas line against the bottom of the carburetor. Gasoline seemed to be squirting all over me. Murry was already turning the motor with the starter.

"Whir-r-r. Put-put-put." Was there ever a more welcome sound? The motor started, the rudder took hold and at the last possible moment we spun around to meet the breaker.

"Swish—ya-a-h-h-h." The great wave raked our boat from stem to stern and drenched us with spray. But the staunch little craft did not founder.

"We still have a chance," shouted Father Kirschbaum with joy in his voice. "Don't try to go against the current. Head for that smooth place in the center of the inlet."

There followed a long period of strained nerves for us and narrow escapes for the launch. Finally we got into smooth water and headed up the inlet but we had drifted well over half a mile out to sea and the current was so strong against us that we made very slow progress getting back.

In the meantime I was still lying on my back with my head in the bilge next to the flywheel and my right hand clamped around the gas line. Since the first wave hit us Schmidty had been sitting on me to keep me from rolling into the machinery. It was the most awkward and uncomfortable position I have ever been in. My hand grew so numb that there was no longer any feeling in it. Yet I could not let go of the gas line for fear we should drift out to sea again. You may well believe that I was glad when after twenty interminable minutes we reached the lagoon once more and tied up to a mangrove tree.

The Crane Pacific Expedition had plenty of Pacific *that* day.

Having rejoined the *Illyria,* we reached Marienberg early the next morning, for it was but ten miles upstream from Bien. At the point where Father Kirschbaum told us to anchor the only signs of civilization were two small sloops made fast to an antiquated pier and a rickety boathouse on the shore.

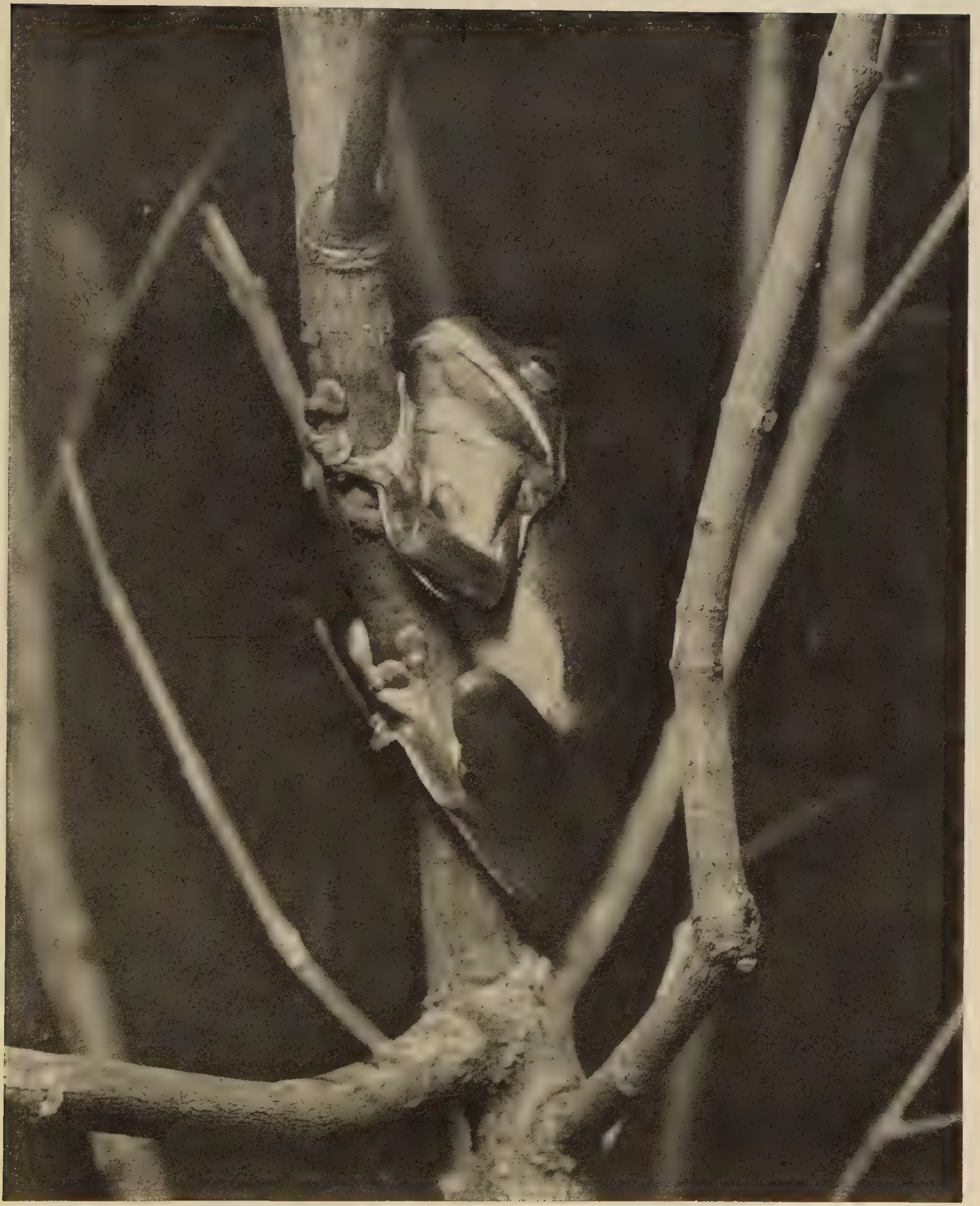


Photo by K. P. Schmidt and the author

Hyla Infrafrenate, One of the Singing Frogs of New Guinea

The Father led us past these and along a shaded path to a low hill which stood nearby. On the summit were grouped several small houses and one large one, the mission. A group of native men, women and children dressed for the most part in cotton loin-cloths came running out crying, "Good day, Fadder. Me glad see you."

"This is my real home," explained our host. "I have lived here alone with my native friends for over twelve years and we have gotten to know each other pretty well by now. Look around and make yourselves at home."

About three miles west of the mission we could see a steel tower rising above the tree tops.

"What is that for?" we asked.

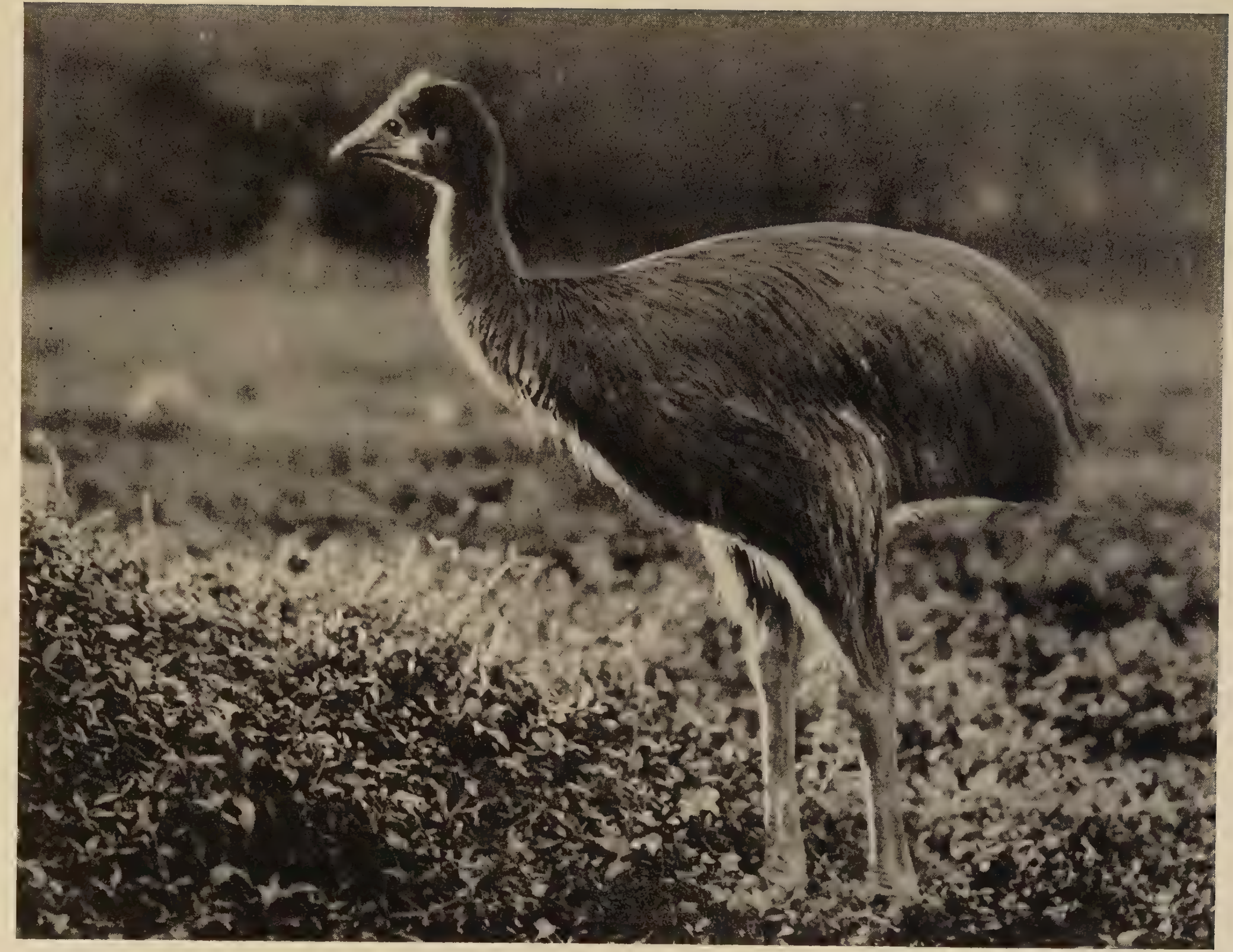
"There is a government station over there," explained the Father. "Two young Australian District Officers and a radio operator live there. They are supposed to control the native 'police boys' in all the neighboring country and to act as customs officers on the river. The radio station is one of the few in this part of the world."

When we visited the radio station we found a message had been forwarded us from Rabaul. The sender was a man who had developed some of my movie reels of Galápagos which had been shipped home to him from Tahiti. He reported that certain parts of the film were out of focus. As soon as I returned to the *Illyria* I checked up on the lens of the camera with which I had taken those reels and found that the setting of the objective glass had been disturbed. Amazing indeed to be told by a man 11,000 miles away in Boston that an accident had happened to my camera in Galápagos! I was glad to be able to correct the maladjustment before we came to the more important parts of the Sepik.

Since Father Kirschbaum had told us he needed two days to set his affairs in order at the mission before we continued up the river the scientists took their equipment ashore and set up a temporary camp in the mission from which base they could more readily accomplish their work. The Father lent them several "boys" to help with the collecting. Soon the specimens began coming in thick and fast.

One of the first "finds" was a three-quarter grown cassowary, a gawky, ostrich-like bird which has completely lost the power of flight, its wings being reduced to mere vestiges. Its legs, on the contrary, have developed to tremendous proportions, so that although it is only about three feet high the cassowary can run considerably faster than a man and administer a powerful kick. The brown feathers are so small in diameter that they look like coarse hairs. Its nearest relatives are the emu (of Australia), the ostrich and the rhea but unlike them it is a jungle bird rather than a savannah or steppe country type.

Schmidty told us a rather delightful story about the cassowary which he says is well known in the world of science, although it has never been proven. According to the story, the cassowary fishes by going into the water up to his neck and fluffing out his hair-like feathers. Small fish, mistaking the feathers of the bird for a mass of water vegetation, soon take refuge in them. The cassowary, after waiting patiently in the water for a half hour or so, makes a sudden rush for the shore and shaking himself thoroughly proceeds to devour the fish thrown onto the ground.



A Young Cassowary Found near Marienberg, New Guinea

Another queer specimen was the cuscus, a round furry little animal with great staring eyes resembling those of the opossum —of which it is indeed a distant cousin. A young cuscus was brought into camp the first day. The bright sunlight to which it had been suddenly exposed seemed to have dazzled it, for it looked around with apparently sightless eyes and made no motion to escape when we released it, nor effort to scratch or bite when we handled it. Schmidty pointed out that the strong prehensile tail of the little fellow would enable him to climb about in the tree tops at a great rate of speed. Nevertheless we found later that in the daytime the natives are able to capture cuscuses without any difficulty. They simply shoot them down from the tree tops with bow and arrows or "throwing sticks." On the middle and upper parts of the river we saw many cuscus-skin caps, head-dresses and ornaments, and also met cuscus stew.

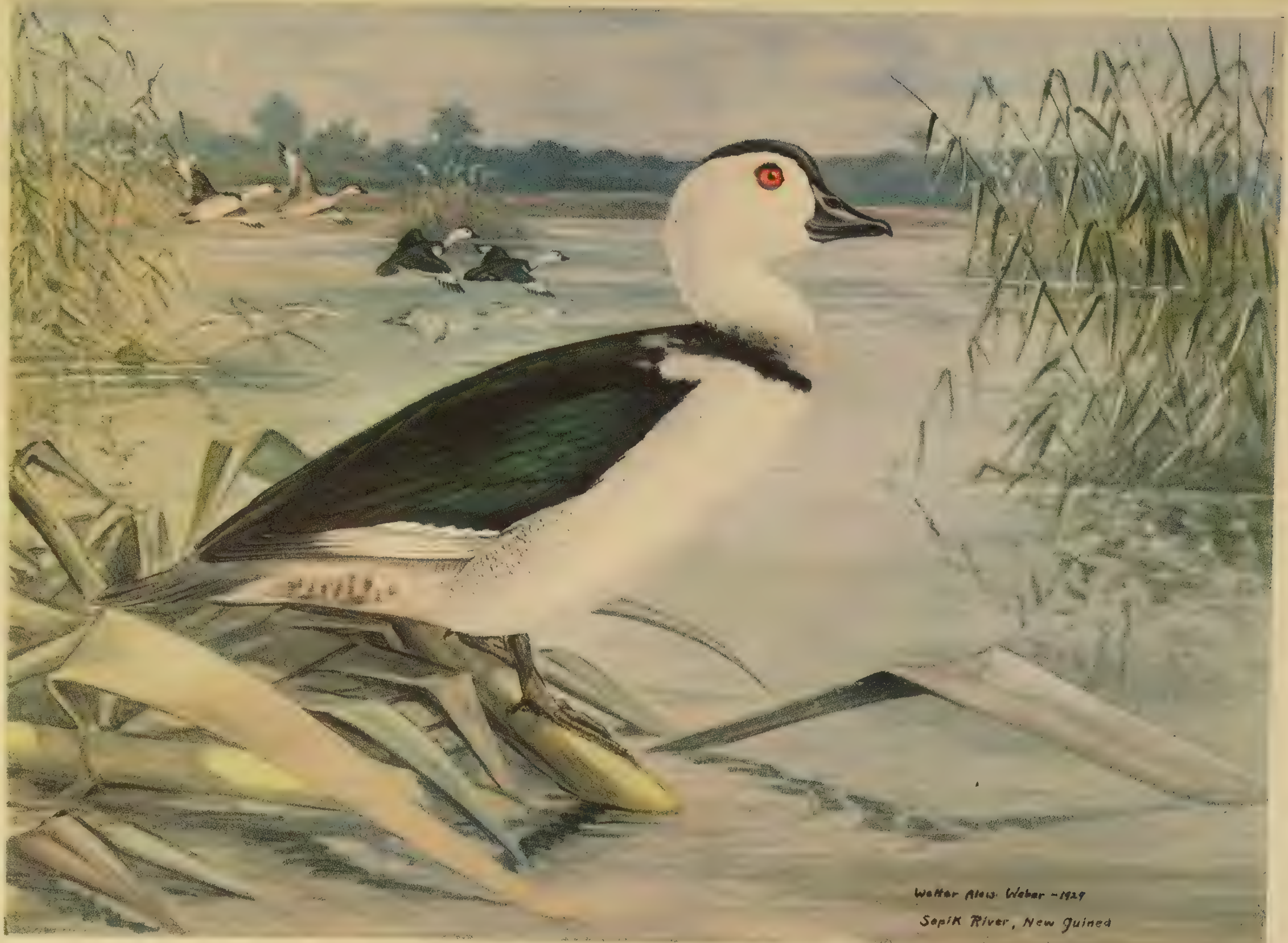
Many kinds of rare birds were collected at Marienberg under the direction of Walt and Frank. The list included bower birds, unusual parrots, herons, bitterns, beautifully colored pigeons, exotic kingfishers, cormorants, ducks, grebes, hornbills, plover, sandpipers, a queer variety of crow, pygmy geese and many song birds.

The hornbills and the pygmy geese are worthy of special mention. The former is the most awkward looking bird one can imagine, if the pelican be excepted. Although the hornbill stands only about twenty inches high his bill is nearly a foot long and about three inches wide. This bill is colored a very bright yellow except near the head where it is blue and red. And as if to make it even more ridiculous the bill has a series of bumps near the base which look like warts.

The eyes of the hornbill are very large and glassy and each one is shaded with a purple eyelid lined with long black lashes. The neck is yellowish brown. The rest of the creature is jet black, except for the wings and tail which are white.

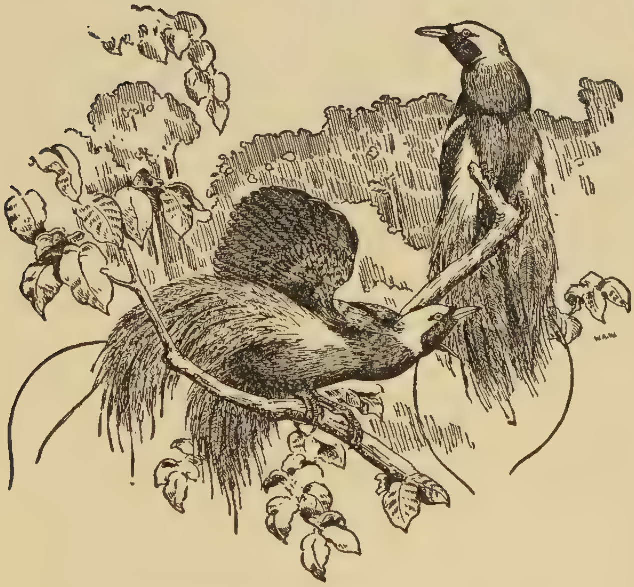
Either roosting or flying the hornbill is perfectly laughable to look at and the gravity of the situation is not increased by the rather burlesque hollow squawk which the bird emits when in flight. One impressive characteristic however is the sound which the wings and feathers of the hornbill make when he is flying. Each wing stroke can be distinctly heard and the sound is much like that of a sheet being ripped from end to end combined with a long, drawn out whistle. When a whole flock went over us at once on their way from one fig tree to another the shrieking of the wind through their feathers was loud enough to be truly terrifying.

The pygmy geese were also almost too good to be true. At daylight on the second morning of our stay at Marienberg I made a special expedition to a sugar cane bounded swamp ten miles up the river, in the hope of getting some. After the sun rose I saw several flocks of small water birds feeding among the waterlily pads which floated on the surface of the lagoon. These birds were shaped just about like ducks but they were not over nine inches long from bill to tail. The iridescent colors on their wings and necks were very brilliant. When they flew their wings moved fully as fast as those of a duck and made a similar whirring noise, though the note was so high that the sound did not carry any great distance. They were such beautiful and friendly little birds that it seemed a pity to shoot them but as I knew Schmidty and Walt were


Walter Alois Weber -1929
Sepik River, New Guinea

particularly anxious to get some since they exist only in one other part of the world, I brought back seventeen.

I could use many more pages telling of some of the other strange birds that were to be seen at Marienberg. A chapter could easily be written on the strange habits of the bower bird and his mate; a treatise would be required to deal fairly with all the kinds of birds of paradise; and at least a page should be devoted to the parrots and the varied pigeons of New Guinea.



CHAPTER X

WHITE GHOSTS IN NEW GUINEA

ON the Middle and Upper reaches of the Sepik many strange and interesting events occurred and I made a point of recording them in my diary. It made my evenings laborious, but now I am glad that I took sufficient time to set down clearly and vividly our first impressions. In order to avoid any loss of accuracy which might result from rewriting I shall reproduce my journal almost as it stands.

May 12th.

At nine o'clock this morning we waved goodbye to Frank and Walt (who are remaining in Marienberg to continue collecting specimens) and set out up the river and into relatively unknown territory. With us we have Father Kirschbaum and four of his native boys. Since the latter know the channel in this part of the river fairly well we are able to get along without difficulty, making a speed of six knots against the three knot current. The water is still at flood height and very muddy.

The country on each side is so heavily wooded that we can not see further than the river's banks unless we climb to the masthead. Small patches of wild sugar cane which occur every few hundred yards along shore are very interesting to Schmidty who keeps rushing to the bridge to photograph them. He also points excitedly to the many great white herons, cormorants and ducks which are so tame that they scarcely bother to fly from our path. We are keeping a sharp watch for crocodiles, but there are so many floating logs in the river that it would be nearly impossible to distinguish one.

About one o'clock we came to a fork where the Keram, a small tributary, joins the main river. Acting on Father Kirschbaum's advice we swung into this branch in order to make a side trip to Ambot, an unusual village about thirty miles up stream.

As we were all occupied in eating lunch when we entered the Keram we were surprised on looking out the windows to see how narrow the river had become. A few minutes later we were even more surprised to hear a tremendous crash and see a shower of broken branches fall onto the deck. Dashing out to see what could be the matter, we found that in attempting to round a very sharp curve the Captain had been unable to swing the ship sufficiently to avoid sideswiping a fig tree which overhung the river. The yardarms had torn off some of the upper branches of the tree. The after lifeboat had been slightly injured by one branch but luckily no serious damage had occurred, even to the rigging.

From that point on the afternoon was one of constant thrills and narrow escapes. The river was seldom over a hundred and fifty feet wide and oxbow bends were numerous. Nevertheless we had to keep going quite fast in order to maintain steerage way against the strong current. Within the first ten miles we had struck two more trees with our yard-arms; had buried our bowsprit in the sugar cane; had twice struck underwater snags and many times been forced to use full speed reverse to avoid more serious accidents.

The Captain became alarmed, for as he rightly pointed out, it would be no joke to become stranded in this mosquito-infested swamp land, especially as our drinking water supply could not be counted on to hold out more than a few weeks. However, Father Kirschbaum assured us that Ambot was only a few miles further upstream and that when we arrived there we should find a better place to turn around than anywhere on the way up.

"All right," said the Captain, "I'll do as you say but I have had more close shaves in an hour on this river than in three years at sea!"

Hardly had the words left his mouth than we saw ahead of us a bend sharper than any of those we had encountered before. Since it was impossible to stop because of the danger of drifting ashore the Captain had to keep going toward the bend. When he reached it he spun the helm until it was hard over and telegraphed to the engineer for full speed ahead in order to "kick" the stern around. We struck the turn at the correct angle but the swift current caught our bow and headed the *Illyria* for the opposite bank. We could see looming in front of us the trunks of two huge fig trees which grew on the very edge of the river.

"Full speed reverse!" shouted the Captain, and in almost the same breath he added, "but we can't stop in time!"

The propeller churned the water near our stern into gurgling whirlpools but its force was not sufficient to make us lose headway. Slowly but surely our bowsprit neared the fig trees.

With a loud ripping sound we crashed into the swampy shore, the long bowsprit tearing away the small trees and undergrowth in its path. Then the ship was brought up with a dull thud as her hull struck the shore. But luck was with us! Nothing was broken and the bowsprit had gone directly between the two trees.

With the help of the current and the motor we were soon able to back off again, but as we were still heading upstream there was nothing to do but to continue in that direction. However, the Captain had learned a good deal by his last mishap, and we were able to reach Ambot about an hour later without hitting anything more on the way.

Father Kirschbaum was right when he advised us to visit Ambot. It is the largest and most interesting village we have seen anywhere in New Guinea.

In all, there are about fifty houses packed close together on the right bank of the river with their longer dimensions at right angles to the stream. Most of them are dwelling houses. They are set on piles about twelve feet high and rise to a height of one or more stories above the floor level. In front of each one is an outdoor eating and loafing platform such as we saw at Bien.

Only about half the dwelling houses have "crocodile" gables but there are four tremendous clubhouses each over two hundred feet long which have the largest and most elaborately decorated overhanging gables that we have seen. Even Father Kirschbaum reports that they are the best he ever saw. In each case the point of the gable which represents the tip of the crocodile's nose is about sixty feet above the ground and its projection from the main part of the building must be at least forty feet.

On the biggest clubhouse, the underside of the overhang which, to carry out the simile, might be referred to as the crocodile's palate, is decorated with a crude painting of an enormous man surrounded by several smaller figures. The colors are black, white and red, and the material to which they are applied is smooth and thin like "tapa" cloth. Schmidty and I took a flashlight photograph of these decorations. They are so unusual that I think the picture will form a valuable record.

The native men are very friendly, perhaps because one of Father Kirschbaum's boys originally lived in this district. We secured their permission to go inside the big clubhouse. When we approached we found there were thirty or forty men sitting cross-legged on the floor near a long low window just underneath the projecting part of the gable. From this vantage point they could look down on all the rest of the village and yet could scarcely be seen themselves because they were in comparative darkness. It was very amusing when we looked up towards the painted decorations on the gable to discover that between two lines of the decorative figures was one line of live men's faces.

The only way to get into the clubhouse is by means of a clumsy ladder which leads from the ground to a trap door in the floor. We climbed up, nearly falling through the holes in the ladder in the dark, and found ourselves in a large room about eighty feet long and twenty-five feet high in the center. At the river end of the room we could see the slit through

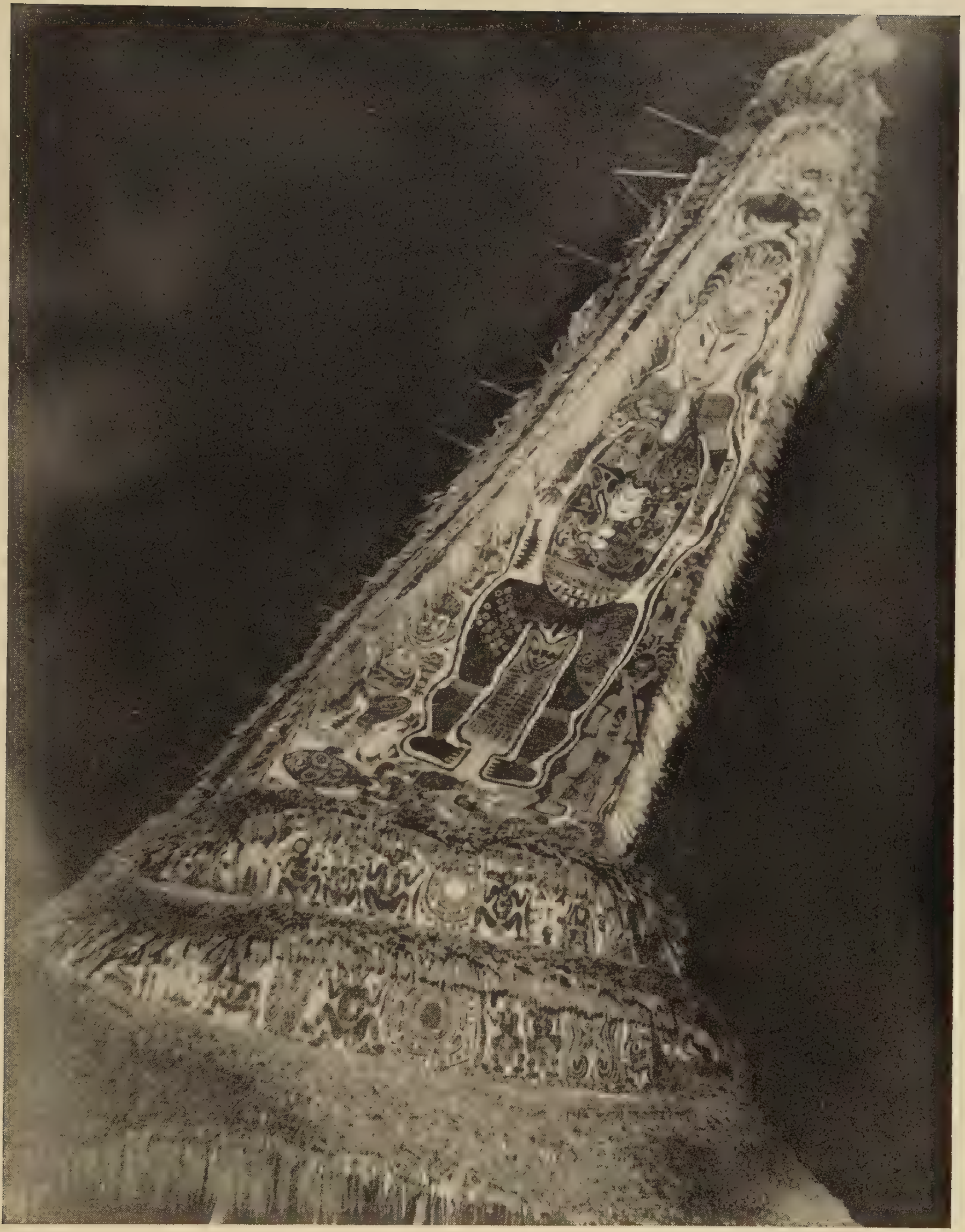


Photo by K. P. Schmidt and the author

LOOKING INTO THE "CROCODILE'S MOUTH"

Curious decorations on the underside of an overhanging gable on the men's clubhouse at Ambot

which the men had been looking, but while we had been making our entry they had all mysteriously disappeared.

Snapping on our flashlights we were able to get a good look at the interior. The floor is made of hand-hewn and polished boards about eight inches wide and the walls have been constructed with cocoanut palm thatching. The posts, forked at the top, which support the ridge pole are very elaborately decorated with painted figures and designs, but otherwise the interior is barren of ornament. The only furnishings which we could see were some woven mosquito-proof sleeping bags scattered about the floor. In several of them men were asleep. Father Kirschbaum told us that similar sleeping bags are used all along the river for without them even the hardy natives could not survive.

As for the hardy explorers, we had smeared ourselves thoroughly with mosquito dope, but even so we were driven nearly insane by the great swarms of the insects which attacked us.

Schmidty soon discovered that what we had supposed was the back of the clubhouse was only a partition. Another room about forty feet long was on the other side. On walking through a semi-concealed doorway we found we had entered a sort of trophy chamber. Leaning against one wall were a dozen shields made of wood with vine lashings. Each was decorated with a dried pig's head affixed near the center. Hanging from a shelf were twenty-five or more distorted human images which had been carefully carved out of wood and decorated with paint, red clay, fresh water shells, and human hair. They seemed to be a great many years old for they were all falling apart. Father Kirschbaum did not know what they were and although he can speak the local dialect he has not been able to find out their history. His guess is that the figures form part of the equipment for an important ceremonial dance.

Several men had entered while we were looking about and having grown tired of watching us had squatted down on the floor apparently to talk things over. Schmidty and I decided it was a good time to take a flashlight photograph, so we set up the tripod and camera. Then we found that the only convenient position from which we could explode the flash powder would be right under the roof. We knew that we were taking the risk of setting the roof on fire, but the opportunity was too good a one to miss so we set off the flash guns anyway. Luckily only one little piece of grass was set on fire and we soon put that out. The poor natives were so scared by the flash that they left the building as soon as they could see again.

As if this had been a warning that if we took chances with the natives' property we might suffer for it, Schmidty and I nearly came to grief later with the same flashlight gun. We had left the clubhouse and were on the point of returning to the *Illyria* when I happened to realize that if we could get a flashlight picture from the shore of the *Illyria* with the jungle in the background the effect would be very striking because the boat would appear brilliant white while everything else would be nearly black. Accordingly we set up the tripod and camera in the right position and loaded the flashlight gun with all the remaining powder, nearly double the usual amount. I took my position at the camera and Schmidty held the flashlight gun over his head.

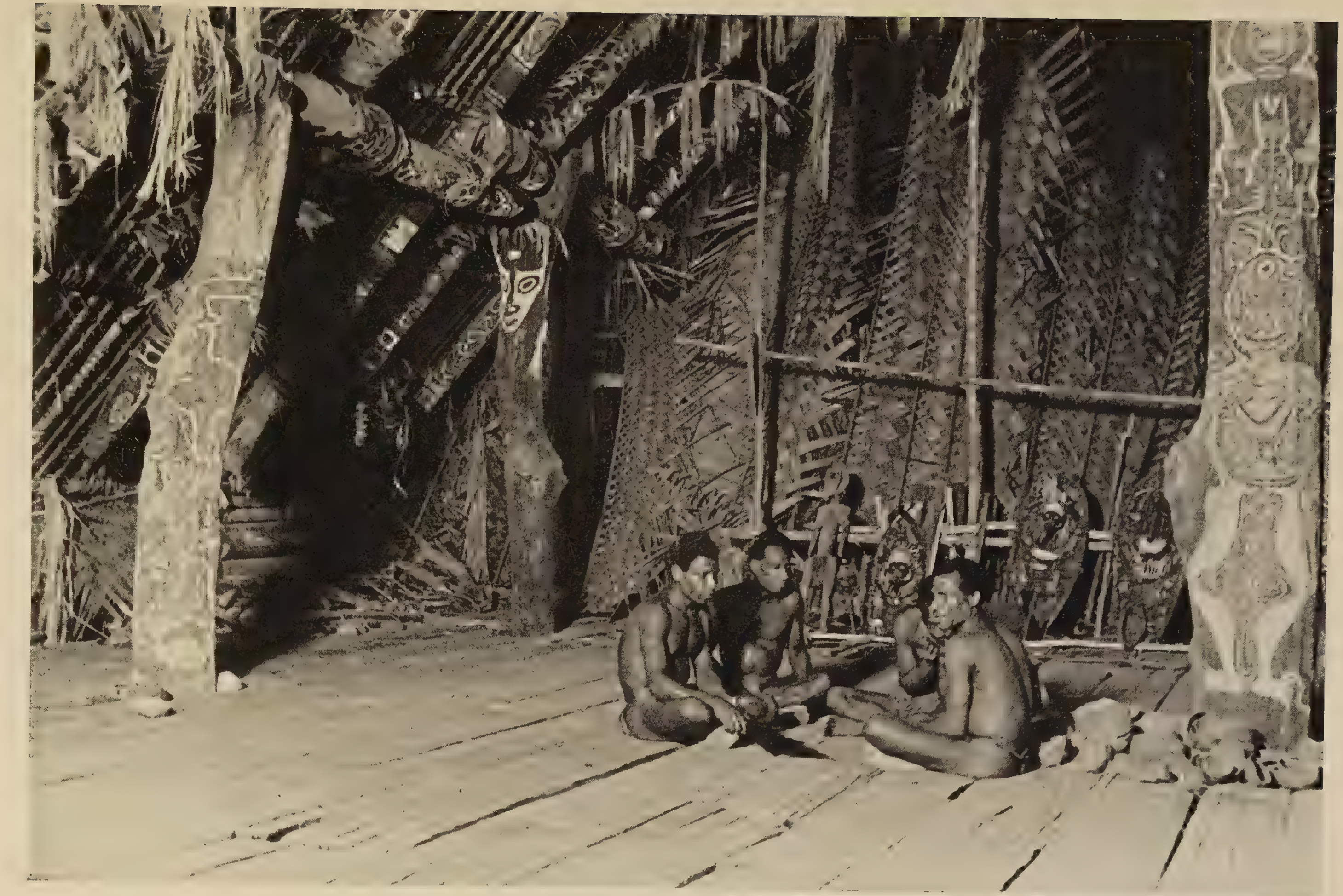


Photo by M. N. Fairbank and the author

A MIDNIGHT SESSION IN THE CROCODILE CLUBHOUSE AT AMBOT

"All ready?" I asked. "Let her go."

"Snap!" Schmidty pulled the trigger but the percussion cap failed to go off. This was not the first time that evening the same thing had happened, so as usual we brought the flashgun down to eye level in order to put in a new cap. Just at that moment Cornelius happened to come by.

"What are you taking a picture of?" he asked. "Not the *Illyria* I hope."

"Why not?" said Schmidty. "She will look very beautiful."

"Beautiful, my eye!" said Cornelius, rather brusquely. "Can't you see all that laundry drying on the after-deck? I think it looks like hell. Don't take it now!"

"Very well. Anything you say," replied Schmidty, who had all this time been holding the flashlight gun in front of our noses. "In that case there is no use saving all this powder so I'll dump it out on the ground." And so saying he suited his action to his words and then handed the gun to me.

"Well, we might as well finish unloading it," I said and started to take out the percussion cap which had failed to explode.

The instant I touched it it went off in my fingers!

If Cornelius had not forbidden us to finish taking the picture we should have removed the cap in order to replace it with a new one without first having discarded the powder. Cornelius's pride in the appearance of his yacht has saved the eyesight of all three of us! Schmidty was so horrified by the narrowness of our escape that he threw the flashlight gun and all the caps into the river.

This has been such a long and interesting day that I have spent nearly three hours in writing about it. It is long after midnight, yet we must all be up by daylight in order to make a launch trip further up the river to Gologopa, another village where Father Kirschbaum promises us events of great interest.

Dr. Moss may not be able to go because Hollander the third engineer, has come down with a mysterious sickness which the doctor is unable to diagnose in spite of his many years of experience with tropical diseases. Hollander's skin has become partly covered with watery blisters which are very painful and apparently the doctor thinks they may become dangerous, for he spent most of the afternoon studying the ailment. Hollander has been given a bunk covered with a mosquito netting on the after-deck so that he can be kept segregated from the rest of the crew.

May 13th.

We got up very early this morning in order to make the trip to Gologopa and started off upstream in the big launch. The river was very narrow and winding but of course we had no difficulty in navigating in such a small boat. We passed several long canoes each paddled by eight men and loaded down with yams, fish traps, cocoanuts and other such articles essential to native well being. We gave one of these canoe parties a tow for several miles, but before long the bow of their boat began to go under the water and part of the carved crocodile figurehead was torn off by the tow rope so they had to let go.

We reached Gologopa within two hours, for it is only about twelve miles from Ambot, but did not find it very interesting. We saw a tremendous clubhouse 280 feet long but it was in a state of very great disrepair and the decorations inside were not as good as those at Ambot. However, Schmidty was pleased because he was able to purchase a very large crocodile skull. He said the original user of this skull must have been about sixteen feet long.

Father Kirschbaum told us that there was another village ten miles further on where he thought we might find some very fine examples of decorative feather work, seen and reported by the tax collector after his last visit. So we decided to make the trip. After we left Gologopa we found the river growing narrower and narrower until finally it was not more than fifteen feet wide. The jungles on each side gave way to marshy country which stretched flatly toward the horizon in every direction except where it was dotted with clumps of trees.

On the marshland herons, plover, bitterns, ducks, etc., abounded. I shot a pygmy goose whose body was only about the size of a baseball but whose coloring was if anything more brilliant than on the geese which I shot near Marienberg. Another bird which I collected for Schmidty was a Jaçana—a very small bird with a red crest on its head and long feathery toes meant for walking on lily pads.

When we finally reached the second village which was located at the very head of the river we found that all the feather work had been taken down so, disappointed, we had to go back to the *Illyria* without having seen anything of great interest.

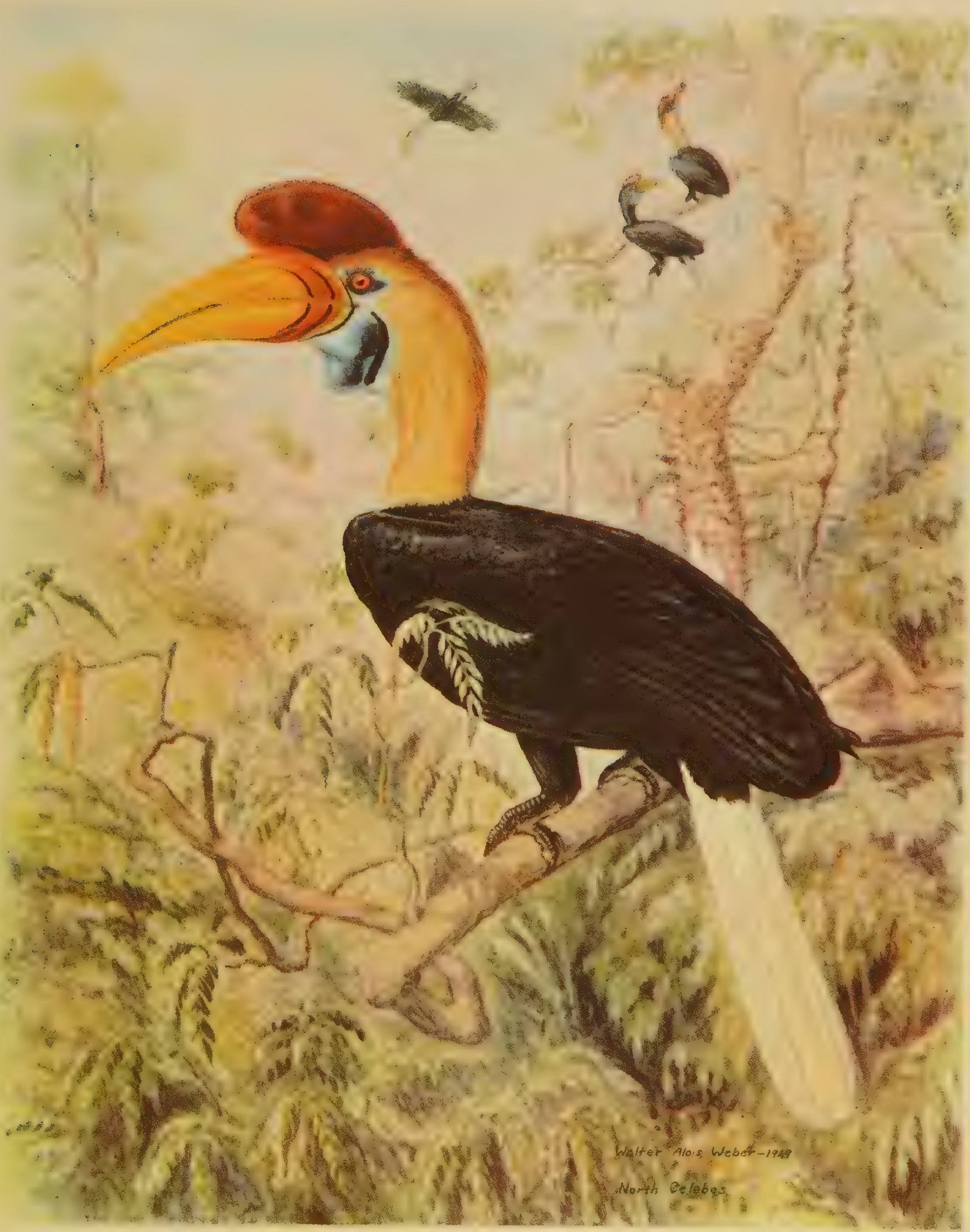
I spent most of the remainder of the afternoon watching some of the women of Ambot who were engaged in the process of making sago meal from pith. The pith had been extracted by the men from sago palm trunks which had been cut in the jungle and floated down the river. The outfit for washing the pith consisted of a long trough made from the base of a sago palm leaf stem set at an angle on a framework so that it emptied into a large basket with a settling pan underneath. The whole outfit was mounted on a raft at the edge of the river in front of the house of the owner.

There were several of these outfits within a short distance of where we were anchored. The women would first put the mashed sago pulp into the trough, kneading it with their hands. Then they would dip up some river water with an earthen jug and pour it onto the pulp which was held from sliding out of the trough by a rough wooden strainer. The water which ran through the strainer carried with it the starchy part of the pulp, which then settled to the bottom of the basket and fell through into the settling pan.

The theory is that after the starch has been separated from the fibrous part of the pith in this manner it can be dried and stored for several months, forming a convenient supply of meal from which cakes or mush can be easily made.

Father Kirschbaum tells us that sago is one of the principal articles of diet of the Middle River culture natives, and that it is also much used along the seacoast. The reason for its importance is that cocoanut palms and breadfruit trees will not grow in the swampy regions. Hence, aside from the few fish and birds which the natives are able to capture, they are dependent on sago. It is the constant consumption of this starchy product which makes them so pot-bellied and so easily susceptible to skin diseases.

The mosquitoes are so thick on shore tonight that we have decided to stay on board ship and are reduced to playing


Walter Alois Weber—1948
North Celebes

CELEBES HORNBILL
Cranorrhinus cassidix [TEMMINCK]
NORTH CELEBES

poker before going to bed. Father Kirschbaum who, though a missionary, is very broad-minded has consented to take a hand and has just succeeded in out-bluffing Dr. Moss.

May 14th.

We left Ambot early this morning and have returned to the Sepik, though not without difficulty. In order to turn the yacht around we had to tie the stern to a tree and let the bow drift downstream. Unfortunately we did not analyze the situation quite correctly and instead of turning around, the *Illyria* backed into the shore and broke off her flagstaff. A second try was more successful and we got started down the river. However, we had not gone very far when we ran our bow onto a submerged sandbank. The current swung the stern around so that thirty seconds after we struck we were aiming upstream again. Then we slid off the sandbank and drifted into the trunks of some trees which had fallen into the river but whose roots were still on the shore. It was a bad situation but by skillful maneuvering we managed to get turned around again in about an hour's time. After that we reached the Sepik without any further difficulty.

Heading upward against the current again we managed to reach a fair-sized village named Magendo by nightfall. Of course we have stopped there because we cannot navigate after dark.

The third engineer is very sick indeed. The watery blisters have formed into hard scabs which cover his whole face and body and prevent the elimination of poison from his system. He is in a delirious state and Dr. Moss has had to keep a close watch over him all day. I hope he pulls through.

May 15th.

We went ashore at Magendo this morning. The village is much the same as those we have seen already. The natives tried to sell us some carved images, drums, etc., but since they were not as well made as those we have bought already we did not get many. However there was one proof that we are reaching wilder country. All the women ran away before we got ashore and we did not even catch a glimpse of them during our visit.

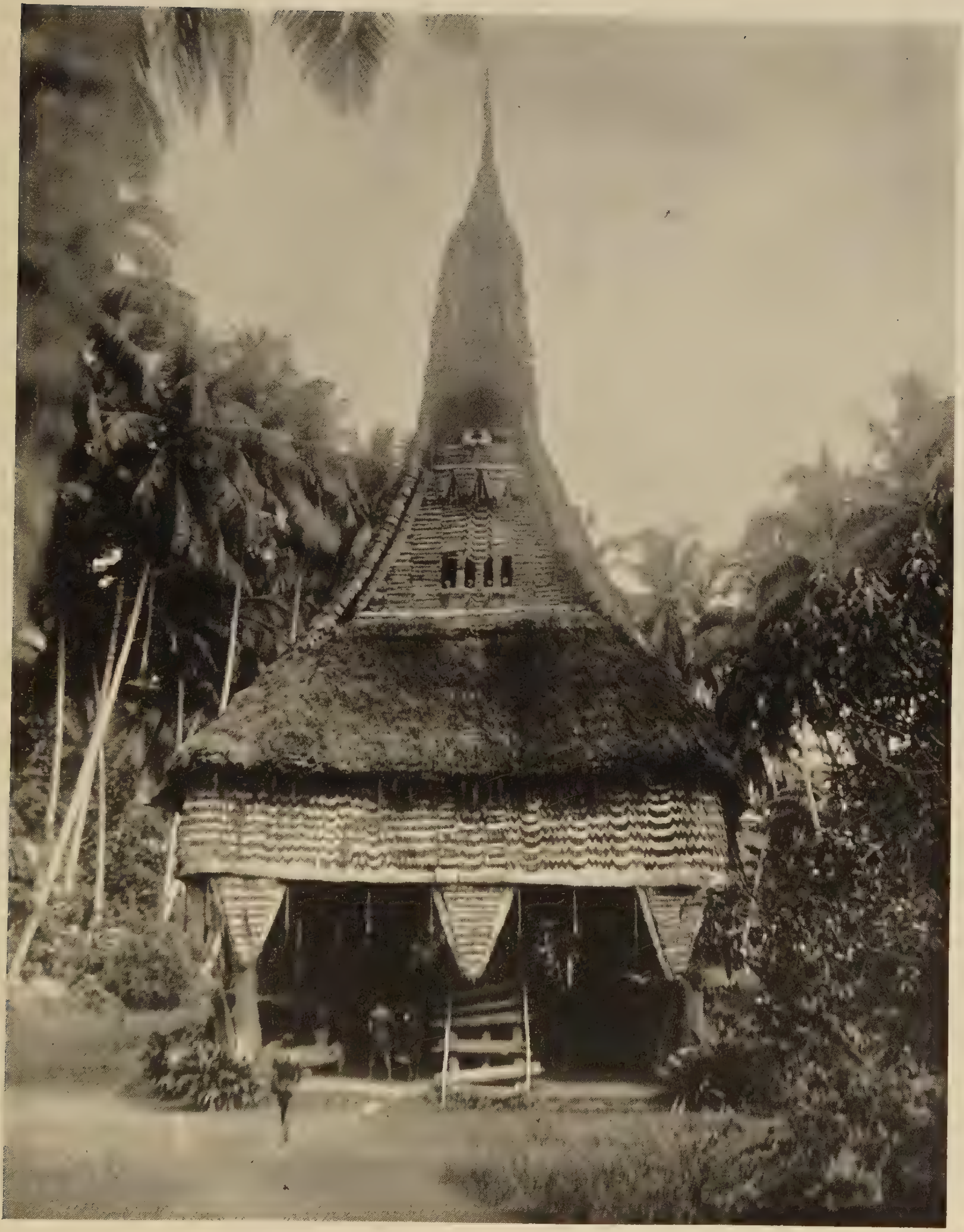
When we left Magendo it was still quite early in the morning and we have been able to go upstream today all the way to Tambunum. All through the day we kept passing small villages and canoeists along the river. About noon the wooded character of the land became less dense and by afternoon there were nearly no trees in sight. Instead the banks are covered with tall, brown sugar cane with beautiful white tassels. The stalks are so high that we cannot see over them from the bridge but by climbing the mast we can see vast lagoons and lily ponds which stretch away to some mountains in the far distance.

Birds are more numerous than ever. We saw several flights of hornbills and in one place there were over a hundred white cockatoos in a single large tree.

About five-thirty in the evening while Father Kirschbaum and I were on the bridge we slowly rounded a sharp corner. The Father suddenly pointed at the mud-bank on the right hand side.

"Crocodile!" he yelled. "It's asleep right there on the bank. Shoot quick!"

I seized the rifle but at first I could not discover the



The Men's Clubhouse at Angerman

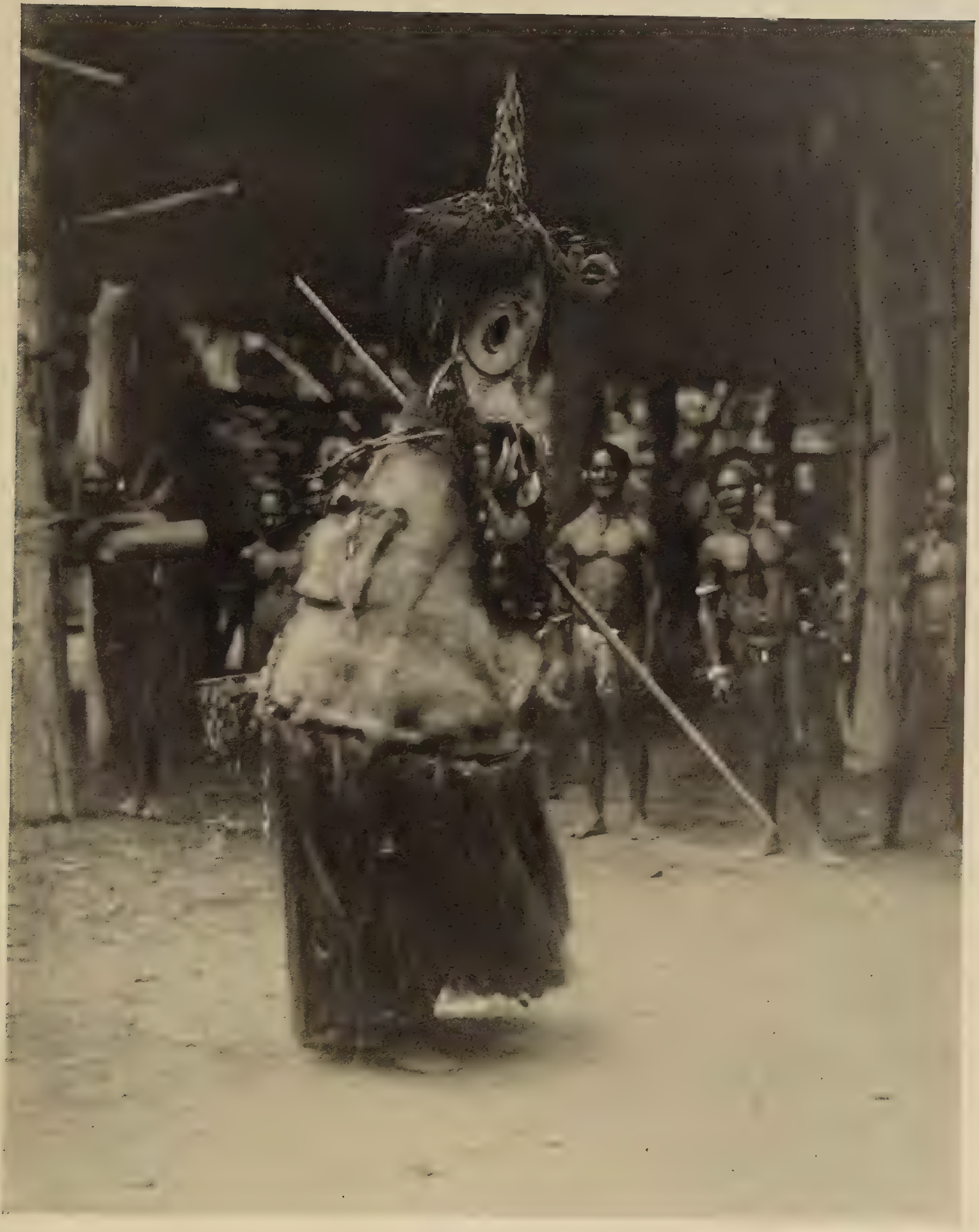
Four human skulls peer from the upper windows seemed as if fully half of them met us on the shore. We elbowed our way through the crowd, pushing away some of the men who seemed to have a rather New Hebridian tendency to feel of our arms and legs, and followed Father Kirschbaum to the men's clubhouse, which is always the first thing to look at in any New Guinea village. This one had no resemblance to the "crocodile" clubhouses we have seen before. Instead of being built on piles the floor level was on the ground and the sides and ends of the building were open up to the eaves. The thatched roof was about one hundred and fifty feet long and curved up at each end into a sharply pointed spire about eighty feet high. The heavy tree trunks which supported the roof were elaborately carved, not painted, and the images instead of being of men were all of women or of crocodiles.

"What is the reason for all these clubhouses anyway?" we asked Father Kirschbaum.

"They serve as bachelor sleeping quarters for the unmarried men," he explained. "And since any man may become unmarried whenever he wants to, bachelor quarters are quite important. Of course the women have all run away today on account of our presence, but even under ordinary conditions you would not see them anywhere near the clubhouses because it is strictly taboo for them to enter.

"The men even go so far as to make fun of the women," he added. "Look at that queer costume over in the corner."

Walking over to the place he had indicated we saw a life-size dummy made of bark cloth attached to wooden frames. It represented a distorted female figure equipped with a grass skirt and a ridiculous head about three feet tall and two feet wide with frizzly hair and a sunken nose. When the natives



A Burlesque Costume: Worn by a Native at Tambunum

saw us looking at the dummy one of the men came up and put it on over his head. Then he walked out into the sunlight and did a short dance during which he mimicked a woman by singing in a high voice and whirling about so that the grass skirt swung back and forth. It seemed rather like a burlesque show at home. We thought the dance was funny but the natives who were watching appreciated it even more than we for they bent nearly double with laughter. I secured several good photographs.

Next we went to look at one of the regular dwelling houses. It was set up on piles about eight feet high and the front of the gable had had openings cut in it to represent a pair of eyes, a nose, and a grinning mouth. In the dark interior were stored all the worldly possessions of the family—fish nets, fish traps, baskets, cooking utensils, ornamental stools, carved wooden images and drums, spears, bows and arrows, throwing sticks, and all kinds of wooden trays and bowls and jugs containing food supplies.

Strewn over the floor were nine or ten of the woven grass sleeping bags such as we saw at Ambot. They were about ten feet long and two feet in diameter with wooden hoops inside to keep them round. I had the temerity to crawl inside a fairly clean looking one and found to my surprise that it was quite cool inside. It had been cleverly woven with spaces large enough to admit air but not mosquitoes.

When we returned to the shore Father Kirschbaum persuaded several of the younger men to demonstrate their throwing sticks. Taking thin straight pieces of young bamboo which had been cut to a length of about two feet they inserted them in nicely carved wooden holders each equipped with a handle.

Then taking a stand on the shore facing the *Illyria* which was about four hundred feet away they hurled the sticks toward her with a swift stiff motion of their arms. Nearly all the arrows went straight as a die between the two masts and struck the water on the other side of the ship.

With the same type of sticks the men were able to hit cocoanuts in the treetops as often as they desired. Yet when *we* tried to hurl them the arrows broke in the handle or fell to the ground within a short distance.

About two o'clock in the afternoon we reached Timbunke, ten miles further upstream. In spite of the short distance between the two villages the customs of the inhabitants differ extraordinarily. At Tambunum the women and children had run away from us and the men had been none too friendly, but at Timbunke the reverse was true. Men, women and children flocked out to meet us in their canoes and soon surrounded the ship in such numbers that we found it difficult to lower away the skiff.

This has been our first chance to observe any of the women of the Middle River district. They are plump, well-formed, and seem to be laughing and happy. Each one paddles about in her own canoe with all the smaller members of the family aboard, for even the babies know how to swim. Most of the women have decorated themselves with shell and bone ornaments which they hang about their necks, and have painted their faces with red and white clay; this gives them a rather ghastly appearance. We noticed that several carried in the bottom of their canoes woven grass raincoats which they put on over their heads and shoulders whenever the weather demanded it.

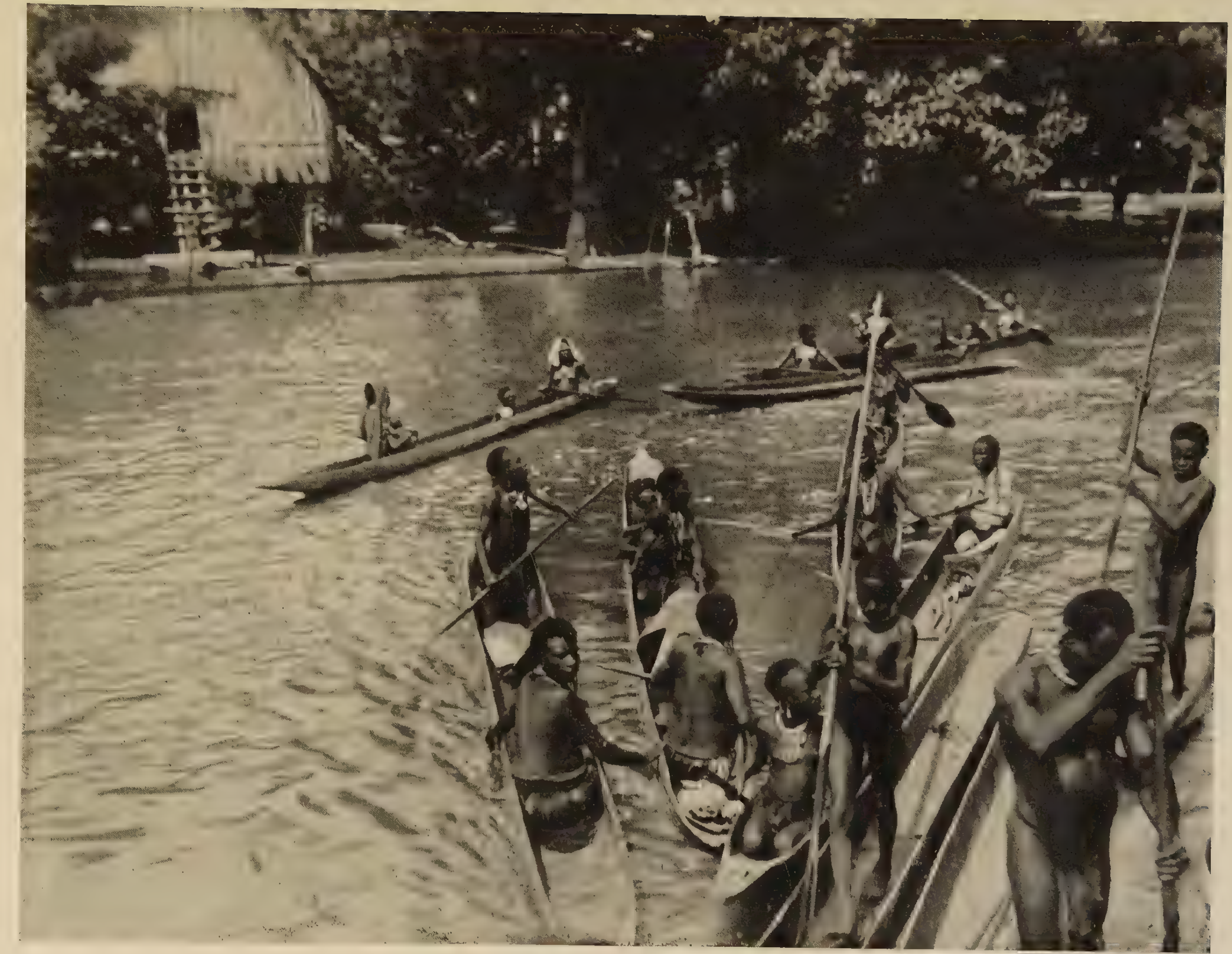


Photo by K. P. Schmidt

Some of the Natives of Timbunke Come Out to Inspect the *Illyria*

Only the men are allowed to stand up in the canoes

When we went ashore I was able to persuade about forty of the small boys to run an obstacle-race across a small creek. They all splashed into the water at once making a very amusing picture. The winner rejoiced at receiving a ten-cent knife for a prize.

When the older natives saw me taking the movies they asked Father Kirschbaum what it was all about. When he told them they were determined to see some of the pictures. Thinking it would be amusing to show them the same reel we had shown in the New Hebrides we told them to come alongside the ship in their canoes after dark.

I spent the rest of the afternoon rigging up a screen on the boat-boom and repairing the projector which has been out of order recently. By the time I had everything in readiness such a fleet of canoes had collected on the starboard side of the *Illyria* that nearly all the water between the ship and the shore was covered with audience. Father Kirschbaum's boy told us that every able-bodied native living within a radius of fifteen miles had come to the show.

Although this was the first movie that has ever been shown here it was by no means an entire success. The audience was spell-bound at first, to be sure, but after a while they began to offer objections which Father Kirschbaum's boy translated into "bêche-la-mar."

"Story belong white man too much altogether," he said in disgust. "Marster he no got story belong Kanaka?"

A little while later he told us that the crowd was especially anxious to see pictures showing what would happen to a native murderer if he were caught by the English District Officer and then taken to court and to jail. Apparently they wished to find out whether it would be worth while to be "sent up!"

Another difficulty with the picture-show was that the projector kept breaking down and as I had to repair it in the presence of one million mosquitoes which had been attracted by the bright lights I only showed three reels before I lost my temper entirely and gave up. We estimate that about four hundred and fifty natives in at least a hundred canoes were present.

May 17th.

Today we have continued up the river as before, keeping a sharp watch for the wary crocodiles and admiring the beauty of the alternating sugar cane fields, tropical forest groves, and great lagoons. I varied the procedure by hoisting the Akeley camera to the crow's nest on the mainmast and fastening it securely so that I could get some really good views of this most unusual landscape.

About four o'clock we reached Angerman, a medium-sized village set about a quarter of a mile back from the river bank. We went ashore but soon began to regret it because the mosquitoes were absolutely unbearable. We made a hasty visit to the clubhouse which with its two tall spires was the most interesting building. From four small openings in each gable grinned four human skulls. Inside the clubhouse were eight or nine beautifully carved, large wooden drums with crocodile heads and tails.

The skulls would seem to indicate that we are entering the head-hunting district and further proof is offered by the fact that Cornelius bought a dried human head for one shilling.

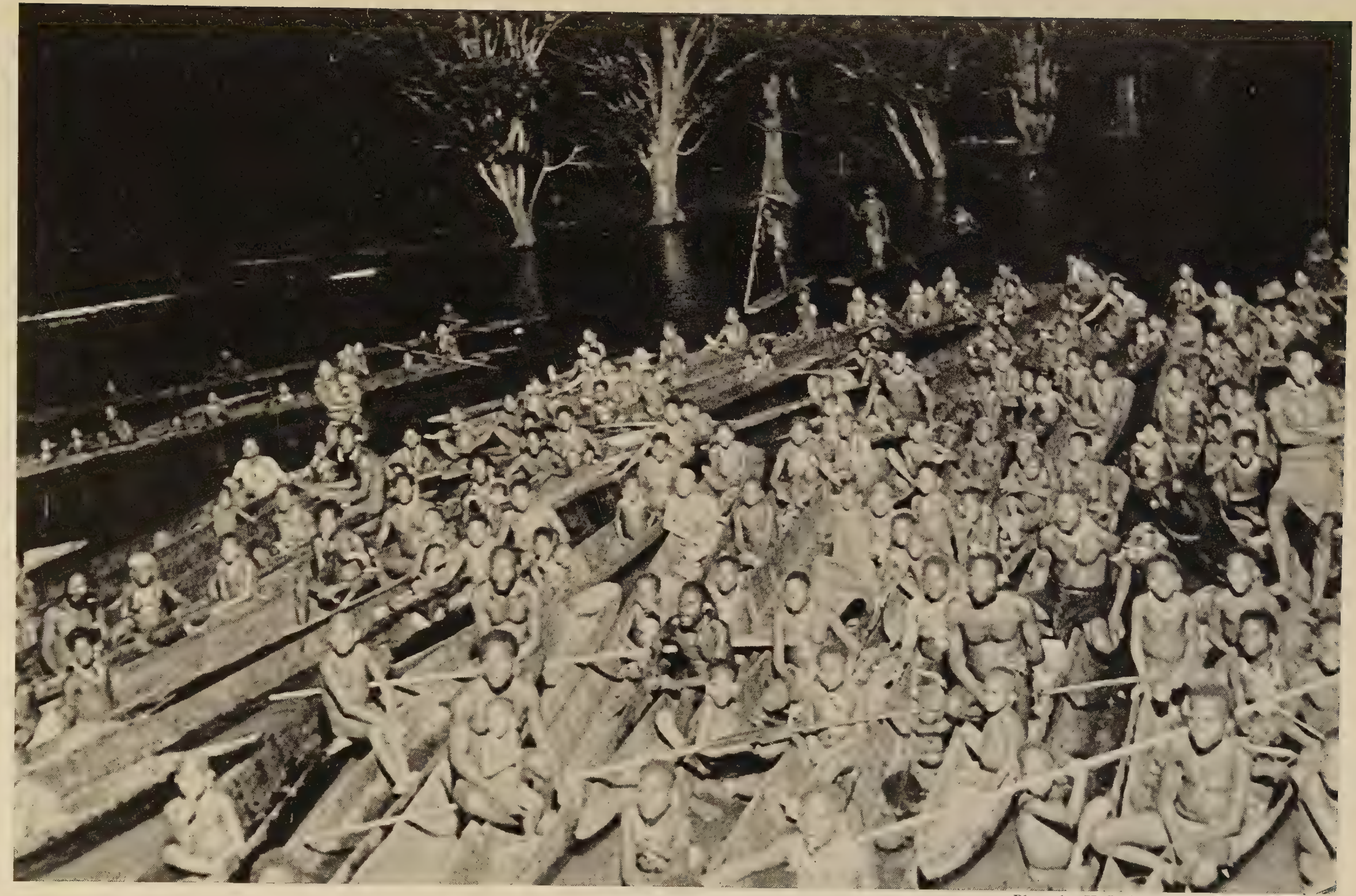


Photo by K. P. Schmidt and M. N. Fairbank

Spellbound at the Sight of Their First Movie; the Entire Population of Timbunke

(Buying heads is strictly against the rules of the Australian government.)

Tonight our daring frog-hunter, Schmidty, has gone ashore braving the mosquitoes in the hope of finding some new species of frogs. He has just returned empty handed and very exasperated.

"Well you see it was like this," he explained scratching his mosquito bites. "I heard a new kind of a frog singing in one of the trees so I climbed after it. But the higher I climbed the further away the frog seemed to be. When I got up about twenty feet I stepped on a rotten branch and came down crashing to the ground on my head. To hell with those frogs!"

May 18th.

Today I continued taking pictures from the mast as we proceeded up the river which is now becoming more and more narrow. At times the country on both sides is hilly. We have seen no crocodiles.

About noon we stopped at Malu, a small village set on a hillside. As usual we saw a clubhouse with twin spires and some crocodile drums—nothing very remarkable. There were plenty of mosquitoes so we did not stay long.

At five o'clock we arrived at Ambunti, the furthest outpost of the white man's civilization on the Sepik. Here in a small uncomfortable house two representatives of the Australian government eke out a lonely and somewhat dangerous existence. The station is very poorly located, being set on a small hill which is almost completely surrounded by impassable marshy country so that in case of attack the only means of retreat could be easily cut off.

We invited both of the District Officers on board for dinner but only one was able to come; the other was in bed sick with malaria. The D. O. who did come told us some very interesting stories. He said that about six months ago when he and the other white man were trying to collect the ridiculous ten shillings tax from the natives of a village a few miles inland, they were suddenly attacked by six hundred savages armed with spears, arrows and big stones. Luckily the white men had brought a bodyguard consisting of twenty-four police boys armed with rifles. They retreated to a clubhouse and by firing off their guns in a desultory fashion held the natives at bay for four days without killing any of them. On the fifth day the attacking force attempted to set the sheltering clubhouse on fire.

"Well I couldn't stand for that, you know," said the D.O., "so I had the 'boys' kill three or four of the natives. At that the whole six hundred of them ran away, though as a matter of fact they could have overpowered us easily.

"Several months later, after peace had been made, I saw the chief who had led the attack on us and asked him why he had retreated. He explained that there were only three hundred natives against each white man, whereas he considers five hundred the minimum number for a successful attack."

When we told the D. O. that we plan to go even further up the river he was very much interested. He says that he has never been more than twenty miles above Ambunti himself, and that we are now as far upstream as any sea-going vessel has ever gone. Since the water level is so high he thinks we may have good luck with our project and has given us elaborate directions how to navigate through some rocks which oc-

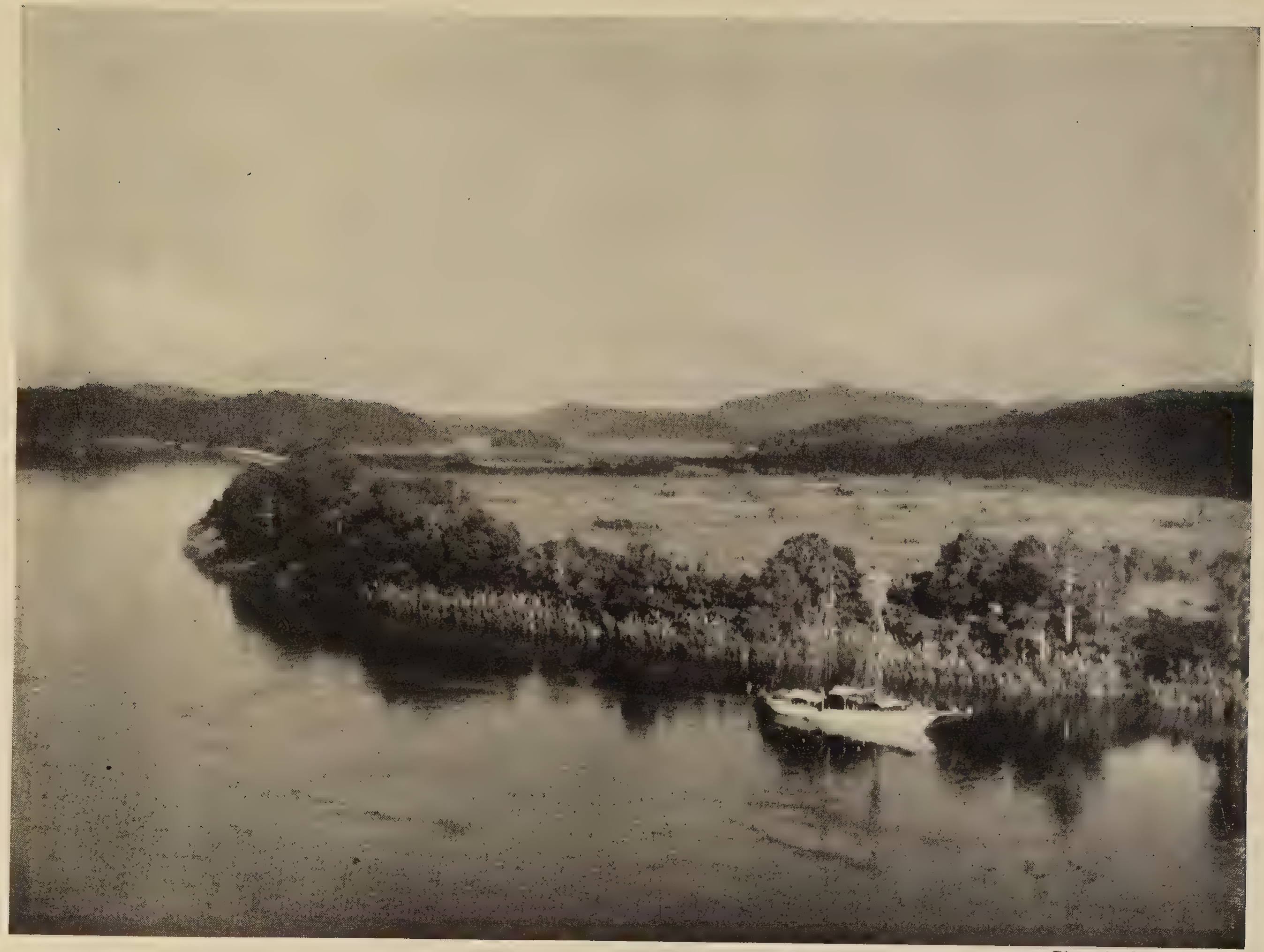


Photo by K. P. Schmidt

A SEA-GOING YACHT IN THE HEART OF NEW GUINEA

The *Illyria* enters mountain country in the Sepik valley six days' journey from the sea

cur in the river about ten miles above here. Tomorrow then, we enter unknown territory.

The third engineer instead of recovering has been becoming weaker. He is a horrible sight to look at, his whole body being covered with hard scabs. His fingernails and toenails have come off and he is still delirious. The doctor says that he has an even chance of remaining alive. There is no use in our turning back because the disease is an unknown one and nobody could do more to cure it than Dr. Moss is doing.

May 19th.

We left Ambunti at daybreak this morning and shortly afterward passed the three hundred mile mark, measuring from the mouth of the river. Father Kirschbaum says that if the high level of the water continues we may be able to get to a point as much as a hundred miles above Ambunti. If we do, we will be in country where no white men have been before except those who made the map of the river.

Today, however, has not been exciting. We have seen a few villages of the ordinary type and missed a few shots at crocodiles. At the point where it was feared that we might strike rocks in the river we got by without any difficulty. One interesting sight was a great swarm of mayflies which drifted by us in a cloud like snow. There were so many in the air that we could hardly see the shore and the surface of the water was white with their bodies. Father Kirschbaum says that the swarming of mayflies in this manner is not unusual.

Hollander is a little better today.

May 20th.

At last we are getting into the kind of country that we have been hoping to see. At nine o'clock in the morning we anchored at the end of a little canal which was pointed out by a native boy whom we have borrowed from the D. O. at Ambunti. He told Father Kirschbaum that a village named Wogumasch was located at the other end of the canal. And he was right! Almost before our anchor reached the bottom we saw a swarm of natives in canoes starting out of the canal toward us. They were all yelling and shouting and waving their arms. Although they soon surrounded the boat they were plainly scared of us at first for they would not come nearer than a hundred feet.

These natives were entirely a new type to us. They were taller and huskier and better physical specimens in every way than the natives of the Middle River district. Most of the men wore no clothes at all, not even a loin cloth. However, they had decorated themselves with nose-plugs, plumes from the bird-of-paradise, bone and shell ornaments, and colored pigments. Some of the warriors were as startling in appearance as those "manufactured" for the movies in Hollywood, and much more convincing.

At the sight of all these wild men surrounding the ship Father Kirschbaum became very excited. He rushed down to the laboratory and soon returned with his arms full of steel knives, hatchets, and adze blades.

"Look," he said, pointing out something we had not noticed before, "these are Stone-Age men! Those sticks they are waving at us are stone axes. We must be in territory where the white man is little known, if at all."

He went down the gang-plank to the bottom step and waved one of the hatchets toward the natives. At first they did

Trading with the Savages on the Upper Sepik—Most of These Natives Had Never Before Seen White Men

not notice it. Then one of the most elaborately decorated men gave a guttural shout, pointing at the same time toward the hatchet. A wave of emotion made visible by their facial expressions swept through the throng of savages. As one man they paddled toward Father Kirschbaum and stretched out such greedy fingers that he was forced to retreat. Apparently they had *heard* of steel before, at any rate.

By this time seventy or eighty of the wild men in nearly as many canoes had closed in on the ship. As they were all armed with spears, bone knives, and bows and arrows Father Kirschbaum showed signs of alarm.

"Keep the anchor chain taut and have the engineer stand by," he told the Captain. "We may have to get out of here in a hurry. For the present they will not bother us as long as I pass out steel implements at frequent intervals. However, I do not wish to give away all our trade goods for we must save some to use later on. And when I stop giving out the presents trouble may begin."

He distributed among us a few dozen of the steel articles so that we could each trade for ourselves. Then the fun began! We had only to lean over the rail and point at whatever article in the canoes or in the natives' hands had caught our fancy. Immediately the natives nearer the ship would snatch it from the owner and thrust it into our hands, at the same time grabbing from us the piece of steel which we had offered. Within fifteen minutes there came over the rail enough spears, arrows, axes, bone knives, paddles, stone adzes, lime boxes, shell ornaments, head plumes, and nose-plugs to outfit an exhibition room in a museum.

We noticed that although any native seemed to be allowed to act as selling agent for any other native the article which we gave in exchange was always forwarded to the man who had owned the original article. They never seemed to haggle about the price except in one or two cases when Dr. Herre tried to get away with exchanging only a fish-hook for some quite valuable article.

After the trading had continued for some time the excitement began to abate a little.

"Now is the time for us to go ashore if we are going at all," said the Father. "The natives seem to be in rather a good mood as a result of having added to their store of precious steel. One of these men seems to be the chief. I will try to talk to him and get permission to go ashore. In the meantime you had better go below and load up your pistols."

Father Kirschbaum found it was not as easy as he had expected to secure the permission he wanted. He was able to talk to the chief by a sign language and by guessing a few words. But we could all see that whenever the Father pointed toward the shore the chief shook his head.

"Old 'Nose-plug' here is not very enthusiastic at the prospect of visitors," said Father Kirschbaum. "He and his friends seem to be afraid that we will steal their wives or even worse, their pigs. Never mind! We'll go ashore anyway."

He and Cornelius and Dr. Moss stepped into the outboard motor-boat which had been brought to the gang-plank only with difficulty for it was necessary to force it through the closely packed canoes of the natives. Then the sailor who was to run the boat cranked the little motor. Suddenly it started with a series of loud pops, at the same time emitting clouds of

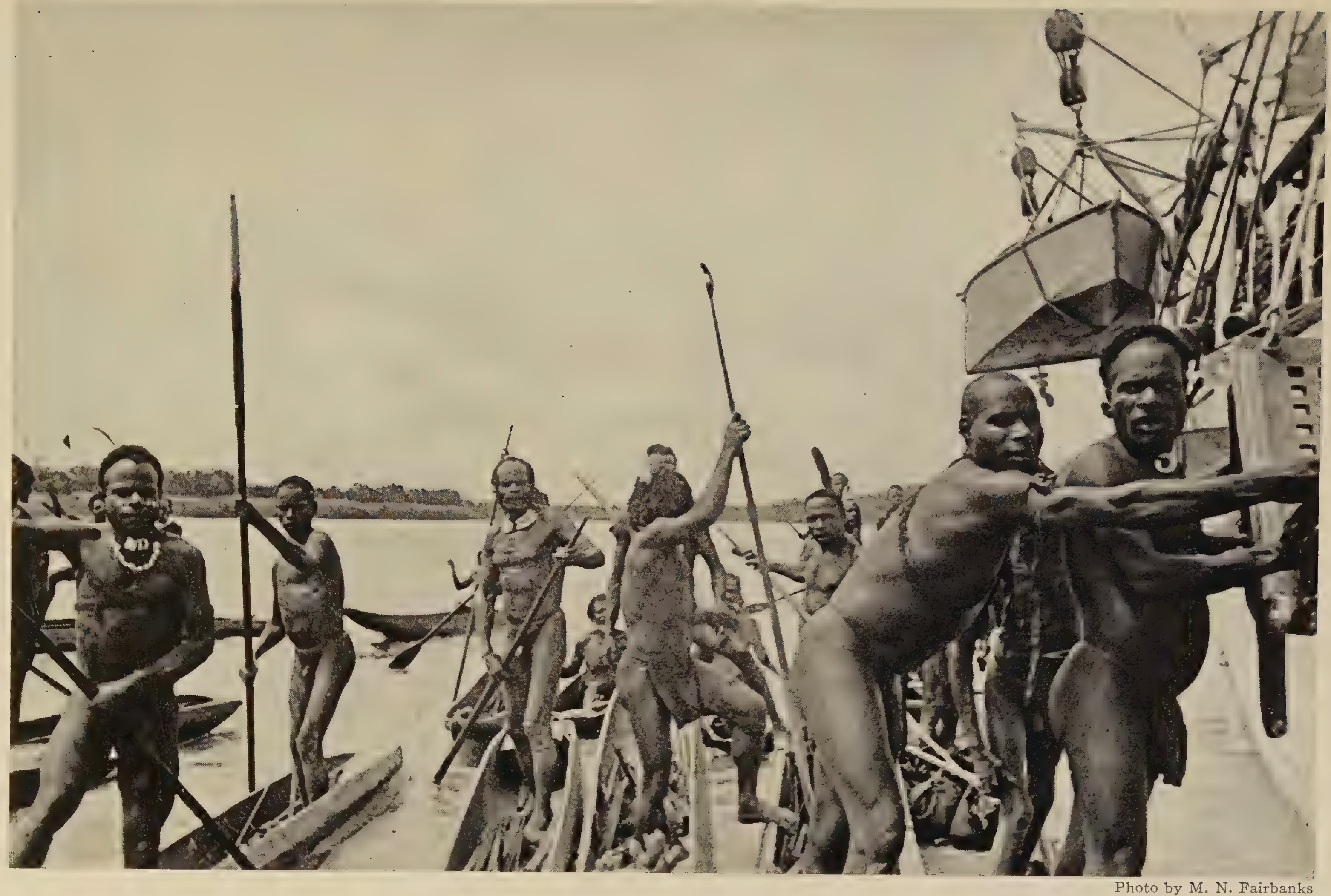


Photo by M. N. Fairbanks

PART OF THE HOSTILE THRONG WHICH SURROUNDED THE *Illyria* AT WOGUMASCH

smoke. The natives were terribly frightened. Madly they paddled away, yelling and shouting. Three were so excited that they fell out of their canoes into the water.

We who had remained on board watched the little landing party enter the mouth of the canal which led to the village. Soon they were lost to sight behind the tall ranks of sugar cane.

For about twenty minutes there was no sign of them. We were worried because most of the natives who had been waiting around the ship had paddled up the canal after our boat. But just as we were thinking of sending a second boat the first one came back with all the natives trailing after it, still shouting and yelling. Father Kirschbaum was the first one back on board the *Illyria.*

"Haul up the anchor and let's get going!" he shouted to the Captain. "These people are more dangerous than I had thought. Not only did they refuse to allow us to land at the village but they crowded around us so close that we had to leave in a hurry."

So we gave up Wogumasch as a bad job and went on up the river in search of more friendly aborigines. And as we went along we could look back and see about half the population of Wogumasch following us in their canoes.

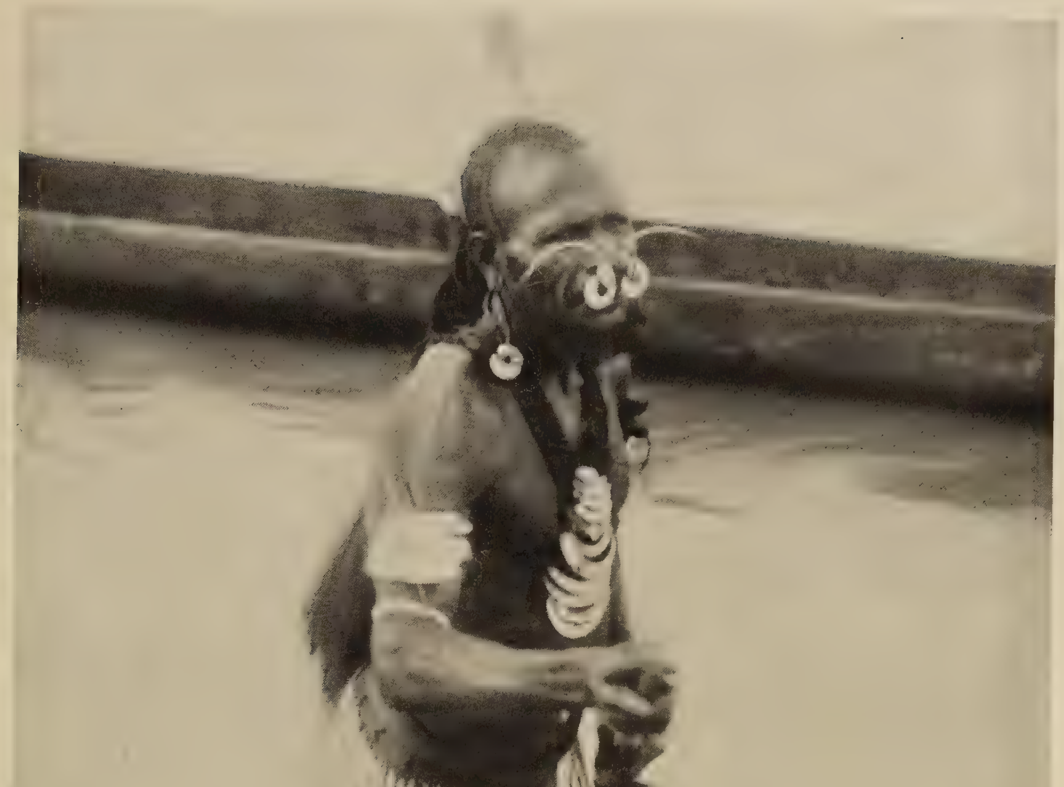
After eight miles of slow progress we came to a bend in the river on which according to our map we expected to find the town of Kubka. No town was in sight, but since Father Kirschbaum thought it might be near at hand we anchored anyway. Sure enough, within a few minutes we were again surrounded by naked savages in canoes, most of which had come out of a small inlet on the left shore.

These men of Kubka were not quite so rapacious or greedy in their desire to trade for steel as those of Wogumasch. We found that we were able to manage them without having to be constantly on our guard. As before, Father Kirschbaum asked permission to go ashore. This time the permission was granted and in such a friendly manner that the Father decided it would be perfectly safe for all of us to go.

Accordingly we piled into the skiff and made ready to depart. We started the outboard motor as quietly as possible but even so the natives were terrified by it at first. However, when they saw us heading into their inlet they regained their composure and followed at such a speed that they reached the boat landing ahead of us, having passed right by us on the way. It was a very inspiring sight to watch the biggest canoe. It was fifty feet long and contained fifteen men all of whom paddled standing up. The bow of this canoe had been as carefully carved as rough stone tools would permit.

We landed at a little cove in one side of the inlet where at least seventy-five canoes of various sizes had been moored or drawn up on the shore. Most of the warriors, still very much excited, had retreated a few paces as we set foot on land but two or three of the braver ones motioned to us to follow them along a winding trail which led away into the jungle. We walked along in single file and the rest of the natives trailed behind us, effectually cutting off any means of escape.

We had thought we were being led to the village but we soon found we were mistaken. After we had gone several hundred yards the men who had been in front of us stopped, forming a line across the trail which barred our passage. At the same moment their compatriots surrounded us from the



A Chief of Wogumasch in His Everyday Clothes

rear, so we were brought to a standstill. So far no violence had been offered, but we were in a bad position for self-defence, had that been necessary. Although we were fully armed the Stone-Age men did not realize that fact for the sight of a pistol meant nothing to them.

"When in doubt, give presents," said Father Kirschbaum. "Just now I am very much in doubt."

He made signs to the natives indicating that he had objects of value in his knapsack which he was willing to give away and persuaded them to stand in a long line in order to receive the gifts in turn. Then starting at the front he went down the line giving one fishhook to each man he passed. When he had given away about forty fishhooks he was at the other end of the line and facing back toward the water. We had all followed him, so we lost no time in returning to the boat landing.

The natives still offered no signs of violence so we concluded that in blocking our trail they had only meant to prevent us from going into the village. No doubt they also were afraid for the safety of their wives and their pigs.

Feeling much safer when we reached the shore we decided to linger long enough to buy some of the stone axes, barbed spears, and bone necklaces which the natives had been carrying. As they were perfectly willing to trade we were able to secure some very unusual artifacts. [1] We even persuaded one of the natives to demonstrate for us his method of using a stone adze. Taking a stand beside a half hewn canoe he began gouging fair sized chips out of it with each stroke of the adze. He showed uncanny skill at hitting in just the right place. We were surprised how fast he was able to work with such a crude instrument.

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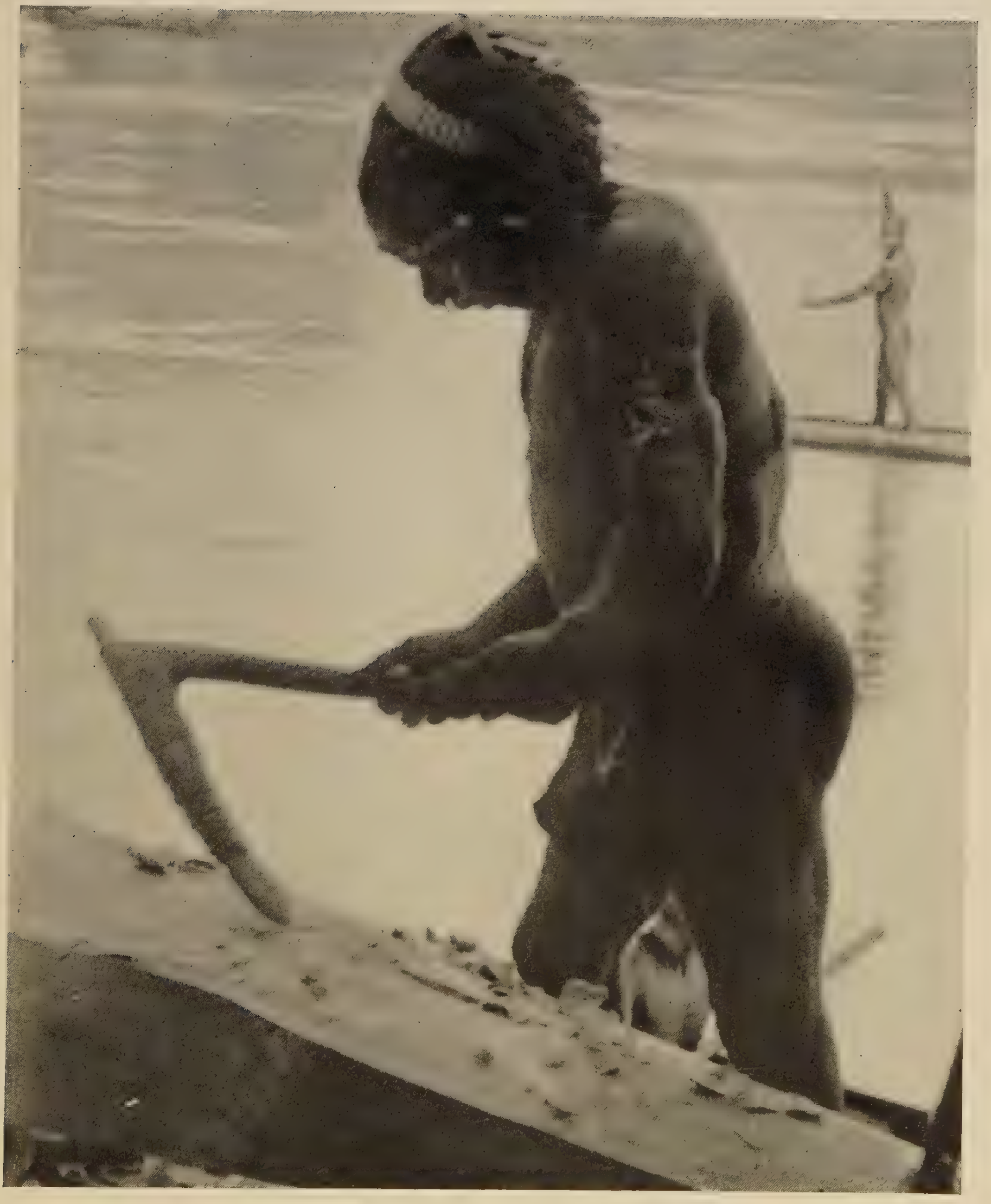
[1] Author's note: Upon returning to this country Cornelius and Dr. Moss showed some of the artifacts from the Upper Sepik River to the directors of the Peabody Museum at Harvard University. The latter were very enthusiastic over these finds, for a similar collection had never been made before. An entire room at the Museum has since been devoted to the display of these objects.

It was about this time that Father Kirschbaum found out from the police boy we borrowed at Ambunti what name the natives had given us. Translated into English it was "White Ghosts From the Sea." I think this name indicates very well their feelings of surprise, fear, and awe at their first sight of us.

During the course of the trading we discovered that Dr. Herre had gotten into an argument with some of the natives. He had secured from them a freshly caught fish which he believed to be a new species but in payment he was offering only three small fishhooks, which were all he had. Instead of coming to us for more trade goods he had tried to walk away with the fish without paying any more for it. The natives in his vicinity had become very excited at this treatment and Father Kirschbaum had all he could do to calm them down when he found out about it.

We returned to the *Illyria* at once rather than risk any more misunderstandings, especially since most of the hostile men we had seen at Wogumasch had begun to appear both on foot and in canoes.

Once back on board the *Illyria* we went on upstream again and were just beginning to forget about our adventure at Kubka when suddenly we discovered that the big fifteen-man war canoe was following us, and even more surprising, was gaining on us. Within a few more miles they had come along-



A Stone-age Man at Work

A warrior of Kubka finishing off a canoe with a stone adze

side and shouted for us to stop. Noticing that the bottom of their boat was about half full of stone axes, spears, extra paddles, etc., we concluded that they were anxious to secure more steel even though they had to sacrifice their most treasured possessions in exchange.

Although we are desirous of conserving our dwindling supply of steel utensils we could not bear to disappoint the men in the canoe after they had made such a tremendous effort to catch up with us. Captain Boutilier slowed the motor down to its lowest speed and we threw the men in the canoe a rope which they caught and soon pulled themselves alongside. Then we bought nearly everything they had brought with them, but even so they were not satisfied for they pursued us several miles more after we had cast them loose again. I shall not be in the least surprised if we find them beside the ship at daybreak tomorrow.

From a philosophical point of view there is something quite stirring in the way these men of Kubka have handled a new and, to them, fearful situation. Although they were terribly frightened of us and our ship they realized at the same time that we could provide them with the one thing they needed most—steel, and knowing this they forced themselves to overcome their fear and to use every bit of wit and subterfuge they could master in order to gain their ends. My hat is off to the Stone-Age men of Kubka. They may be primitive but when they know what they want they go after it.

About five o'clock we anchored for a short while at a third village. The natives there were so very wary that they would not come anywhere near the *Illyria* for over an hour. Finally a few came along side but just then someone started the outboard motor and its noise created a tremendous panic. Every canoe within earshot was rushed frantically for the shore. One man broke his paddle and fell overboard but he was so scared that instead of righting his boat he let it drift away while he swam ashore. Thirty seconds after the motor was started there was not a brown man in sight. We waited for half an hour but when at the end of that time only one or two had returned we hauled up anchor and moved upstream about three miles to a wide place where we are now anchored.

Schmidty went frog hunting on a hill near the shore after supper and has only just now returned (11 P.M.). He says that after he had climbed the hill his electric torch went out, leaving him and the mosquitoes alone in the jungle. The sensation must have been a very unpleasant one for he had lost his bearings and did not know how to get back in the dark. But by lighting matches at frequent intervals he found his way to a point on the shore from which he could see the lights of the *Illyria*. And he got only one frog.

May 20th.

Again we have cruised up the river all day long, this time without making any stops, for there were no villages. Now and then we caught sight of a few brown-skinned figures fleeing at great speed into the jungle at the unbelievable sight of such a monster as the *Illyria*. And at other times stray canoes which we saw floating on the river gave evidence that their owners had very hurriedly abandoned them. There is something both amusing and sad in being able innocently to inspire such feelings of terror.

About nine in the morning we spied a crocodile on a mud-

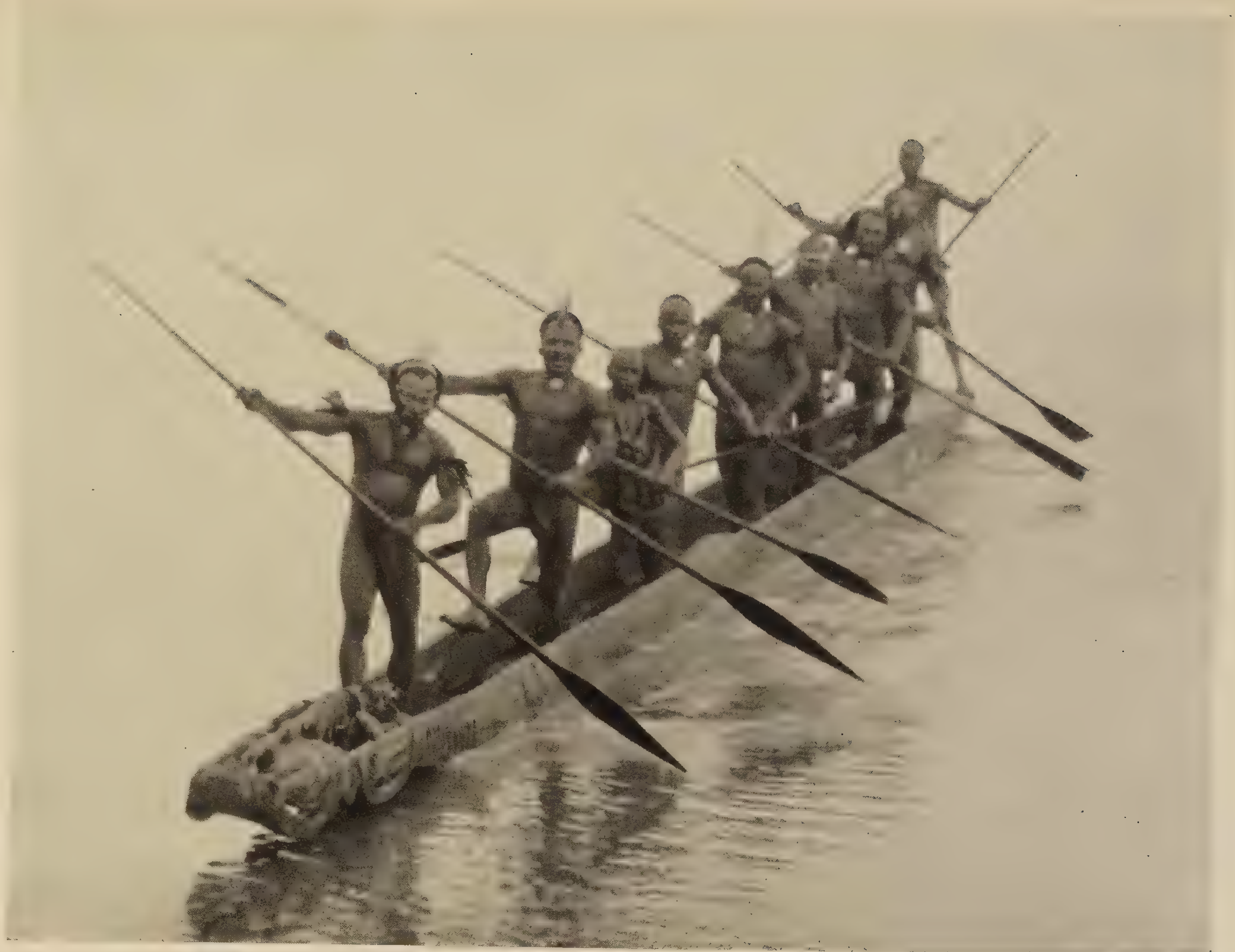


Photo by K. P. Schmidt

IN FULL PURSUIT

The warriors of Kubka chasing after the *Illyria* in the hope of securing more steel

bank about four hundred and fifty feet away. I fired five shots, three of which took effect.

In the afternoon at one spot we saw several natives abandon their canoes and flee into the woods. In one of the empty canoes were two large opossums, freshly killed. Schmidty wanted the skins so we stopped the yacht in midstream and by frantically waving various presents finally attracted the attention of the owner who was hiding behind a tree. After much hesitation and several false starts he paddled out and exchanged the opossums for some crocodile meat and two plane blades. As soon as he got the plane blades into his hands he tore back to the shore and ran into the jungle as fast as he could go.

This evening we have at last reached the junctions of the Sepik and Mai Rivers. In travelling four hundred miles from the mouth of the river we have gone back forty thousand years in human civilization. And tomorrow we are going up the Mai River by launch, for the *Illyria* has reached the furthest point to which she can be navigated. Goodness only knows what will happen to us! The only sure thing is that we won't be bored.

Dr. Moss says that Hollander, the engineer, is on the road to recovery. We are all very thankful.

May 21st.

We have met the Head Hunters and they are ours!

Our whole party left the *Illyria* shortly after daylight in the big motor launch, run by Captain Boutilier, and the small outboard motorboat, run by the sailor Hollander (no relation to the third engineer). At the start both motors were running well so we made good speed for the first ten miles. The winding river, narrow, was bordered with tall sugar cane so that we could not see out over the surrounding country. Along the shores we saw only an occasional house and no inhabitants whatever.

At the ten mile mark the cooling system of the outboard motor became clogged up so we had to tow it. The big launch has a much quieter motor so after the outboard had been shut off we found ourselves coming a little closer to the natives before they ran away. Once on rounding a bend we saw the remarkable spectacle of a whole family jumping head first into the water from their canoe and swimming into the sugar cane, terrified beyond reason.

The day was very hot and the rays of the sun were so intense that we all tried to crowd under the small awning in the launch to keep in the shade. Nevertheless it was distinctly uncomfortable.

After about seventeen miles we were beginning to think that nothing interesting was going to happen when all of a sudden on rounding a bend we discovered that we were heading directly for a large village consisting of several round buildings with high conical roofs, another new style of architecture.

In front of the village we could see the figures of at least sixty men, women, and children. They had already taken alarm at the sound of our motor. When we first appeared the women were in the act of jumping into canoes and as we approached the village they paddled desperately off up a canal. The men must have been equally frightened but instead of running away altogether they retreated to the edge of the

Entering Unexplored Territory in New Guinea—The Start of the Trip up the Mai River

Sugar cane twenty feet high lines the river bank

jungle and from that vantage point motioned us to go away. However, feeling rather brave with our six pistols, four rifles, three shotguns, and two riot guns we proceeded to land. While we were getting out of the boat some of the men dashed to houses on the outskirts of the village and emerged soon afterward heavily equipped with spears, and bows and arrows, but gave no signs of wanting to fight.

We had carefully kept our armory out of sight in order to appear as friendly as possible and now Father Kirschbaum set about the business of making friends.

"I think all you men had better remain in the boats, or near them," he said, "and keep as quiet as possible while I am treating with these warriors. After we have established in their minds the fact that we do not wish to harm them the rest of you will find it much easier to get along with them."

He walked slowly to an open space between two of the houses, which was clearly visible to the natives hiding at the edge of the jungle, and put down on the ground one of his best steel hatchets. Then after rubbing his stomach with his hand as a sign of friendship and pointing to the hatchet he rejoined us. We waited for several minutes before anything happened.

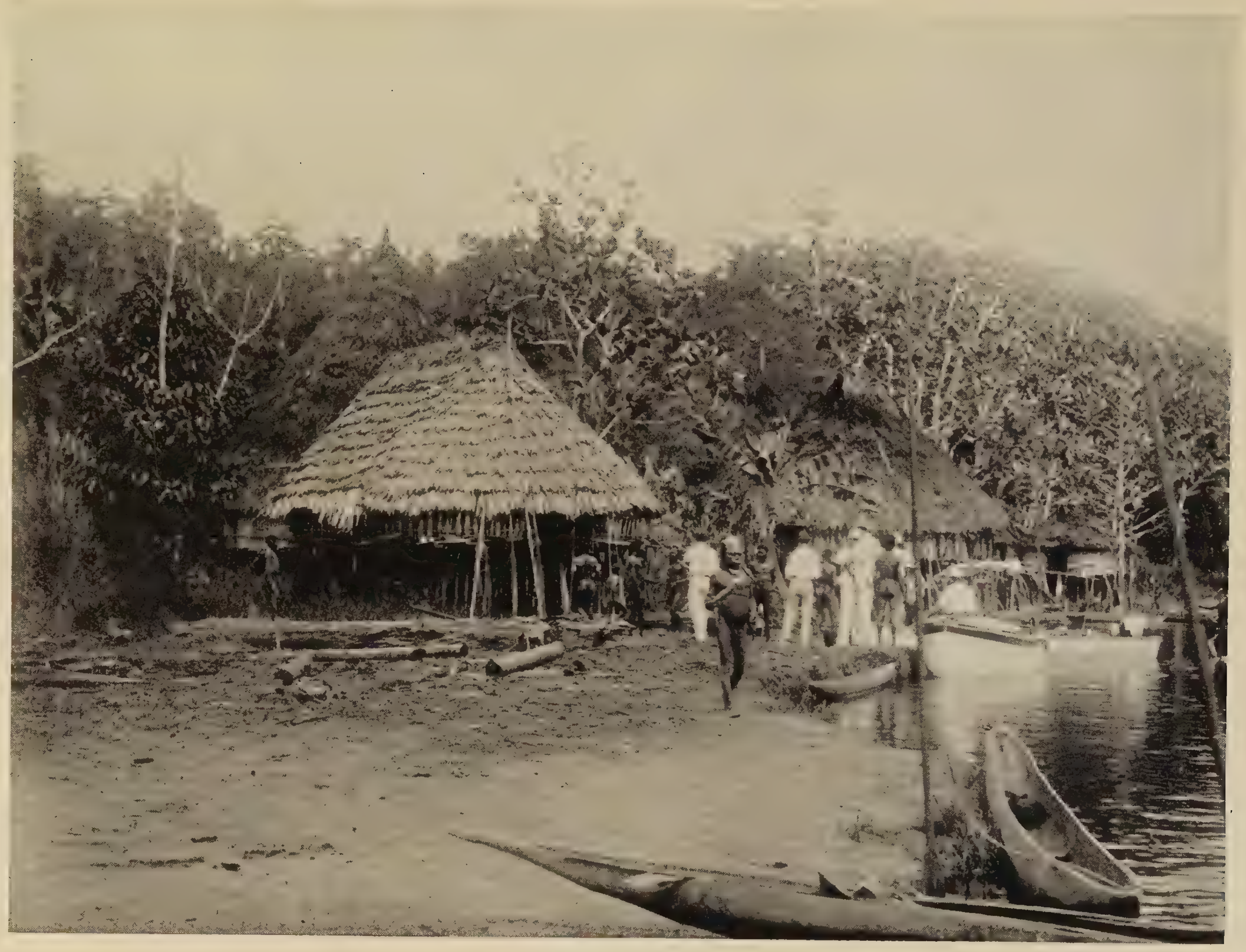
"You can't expect them to act very quickly," said Father Kirschbaum. "In all probability we are the first white men they have even seen or perhaps even heard of, so naturally they don't know quite what to make of us. It's quite possible that they do not even know what steel is, though I should think that tidings of such a valuable material would have reached even this remote point."

Then one of the men who seemed, curiously enough, to be younger than the rest walked slowly out into the open space toward the hatchet but instead of looking where he was going he kept his eyes glued on us. When he reached the hatchet he suddenly stooped down and, picking it up, ran back to his companions.

"So far, so good," said Father Kirschbaum. "Now I shall try to get closer."

Taking another hatchet in his hand and holding it conspicuously in front of him, he walked about two-thirds of the way to the spot where he had left the first hatchet and held it up toward the group of natives as if he were waiting for them to come for it. After a few seconds the same man who had been so daring before came forward again. In his right hand he carried a stone axe of husky proportions which he swung back and forth and up and down as he walked. Father Kirschbaum was unarmed. Nevertheless it was a long time before the native could muster sufficient courage to take the few remaining steps which would bring him within grasping distance of the hatchet. Finally he grabbed it and carried it off triumphantly.

This was the signal which the others had been waiting for. Apparently forgetting their recent timidity they ventured to walk close to us and to allow us to wander all around the village. Wherever we went they followed close behind or even stood in front of us offering for trade what they considered their most valuable possessions. They were very good physical specimens, having strong, lithe bodies, broad shoulders, and rather fine features. None of them wore any clothes whatever, but all were ornamented with nose plugs, bone necklaces, and amulets. Some wore around their chests woven fiber cloth



A STONE-AGE VILLAGE ON THE MAI RIVER

belts, the purpose of which we could not ascertain. Unlike the men of Kubka they did not use paint or clay on their faces.

It soon became evident that the only reason these Mai River men were tolerating our presence was because they wanted to secure steel. They were so excited at the very thought of it that they shouted and yelled and darted backwards and forwards like hens crossing the street, never keeping still for an instant.

"Wus! wus!" they shouted, rubbing one forearm with the palm of the other hand in imitation of the cutting strokes of a knife. We soon decided that "wus" meant knife.

So voluble and violent were these strange people in their desire to trade that we had no choice but to accede to their demands. Dr. Moss bought two human skulls for one ten-cent knife and I got a beautifully carved canoe paddle ten feet long and with feather decorations on the handle for an equally low price. Cornelius secured several bone knives, each about a foot long, which Father Kirschbaum says are made from human thigh bones, and Murry made a collection of stone axes and adzes.

While we were bartering with the men I noticed that some of the women were coming back into the town. "How nice," I thought, "that we are already trusted so much that the women are allowed to return." But I soon found that their reason for coming back was not based on any idea of friendship. Entering their houses, they collected all the babies which had been left behind during their first hurried departure. They put the babies into their canoes and paddled away again, if anything faster than before.

Instead of calming down when they received the steel they wanted, the wild men became not only more excited but also more insistent. When we did not choose to buy some of the articles offered they thrust them almost into our faces, at the same time shouting and pulling our arms to attract attention. The jabbering became so frantic that we decided we had better leave before a row should start. Accordingly, we jumped into the launch and told the Captain to get under way. At first the natives held onto the boat to try to keep us from going, but when the Captain started the motor the noise scared them so badly that they let go.

About half a mile further up the river we anchored in midstream in order to have lunch, but we had hardly started eating when all the same men appeared on the scene in their canoes, into which they had thrust all the articles which we had decided not to buy. They soon surrounded us and in spite of our motioning them to keep away they insisted grasping the gun'n'ls of the launch, and thrusting skulls and other unpleasant articles within an inch of our noses. Captain Boutilier objected to eating lunch under these conditions, so we started the motor once more and ate as we raced upstream.

For some distance we saw no more villages and only a few scattered houses. From these the natives fled at the sight of us and did not return until long after we had passed. At the end of ten miles we came upon a small group of houses nearly overhanging the water on the right bank. On a platform in front of one of these four or five men were sitting. Two of them appeared to be braver than the rest because, although we headed the boat directly toward them, they did not retreat from their position. Instead they waved to us to go away. But

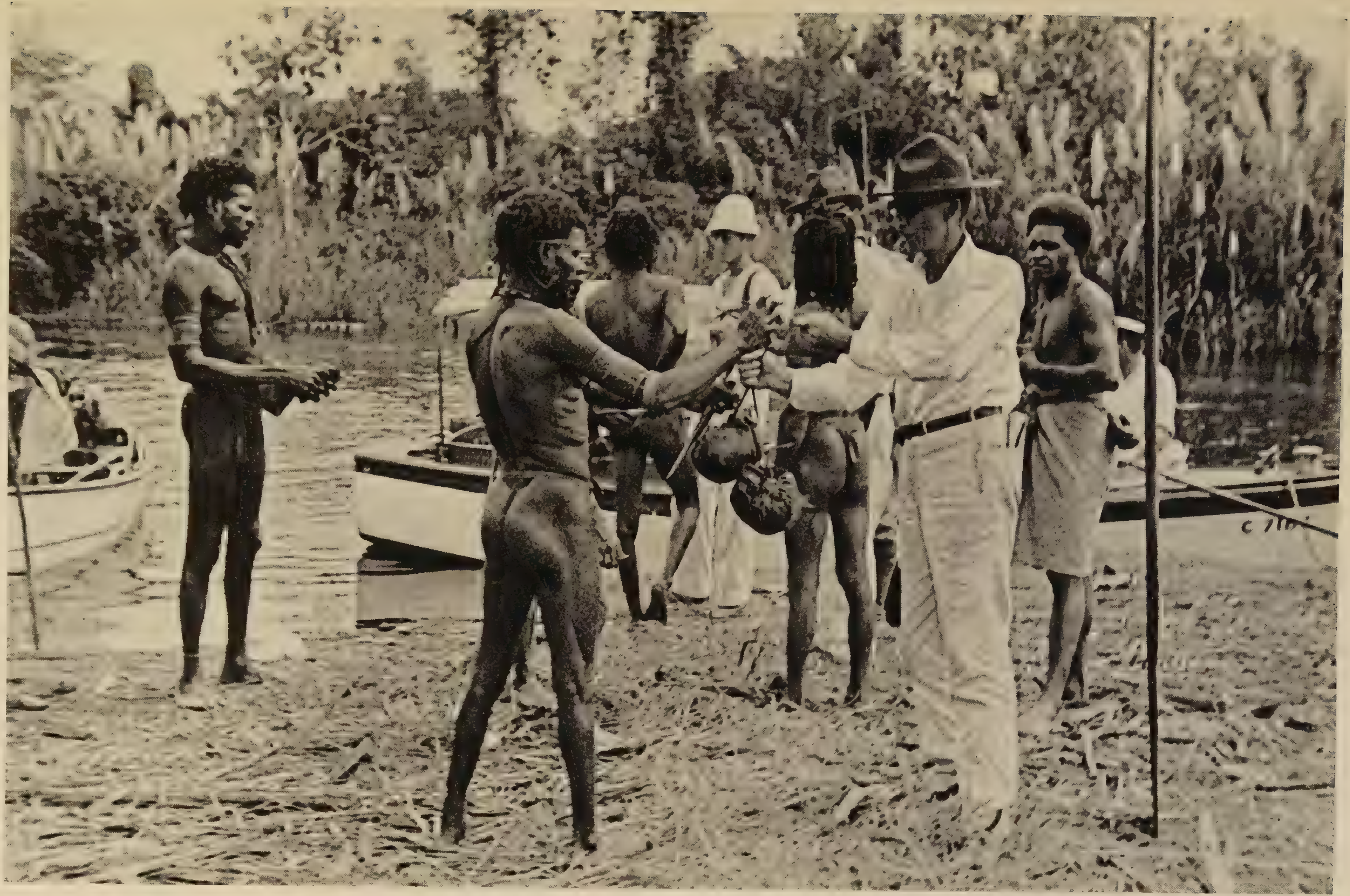


Photo by M. N. Fairbank

Dr. Moss Exchanges a Ten-cent Knife for Two Preserved Human Heads

since there did not seem to be enough men present to offer us any resistance, Father Kirschbaum decided it would be safe for us to draw up to the bank and stop. This we did.

The two savages were very excited. They continued to motion to us to go away, stamping their feet and uttering guttural howls at the same time. The fact that we were holding up pieces of steel did not seem to influence them. For a moment it seemed that we would have to leave or fight. Then a third man armed with a decorated wooden shield about five feet high came running toward us out of the undergrowth.

"Wus! Wus!" he shouted and pointed at the shield.

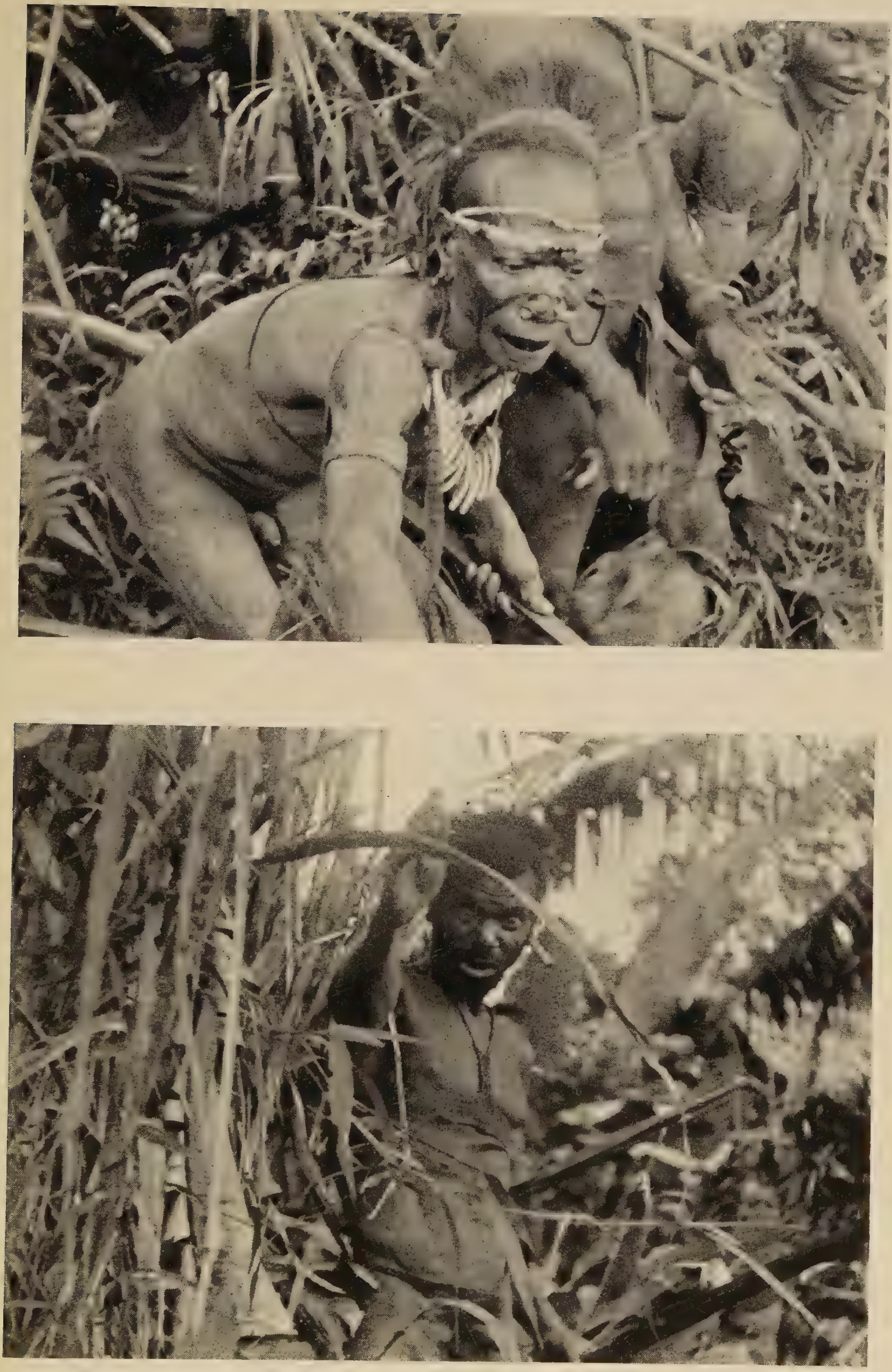
"Here is a man who wants to trade," said Father Kirschbaum. "And since this is the first shield we have seen we may as well buy it. Don't pay any attention to the other two men."

The man who had brought the shield was delighted to receive an adze blade in exchange for it. He jumped up and down in glee and running toward the two men, triumphantly thrust his prize almost into their faces. His enthusiasm seemed to change their hostile dispositions. They ran back into a house and soon returned bearing some skulls, axes, and spears. As we purchased these articles more men appeared on the scene. Then came more and still more. Soon there were thirty-five or forty of them all yelling and shouting at once.

We had hoped to see primitive men and by George! we were seeing them. These fellows were as near to being animals as humans. They were tall and bony. Most of them had distorted legs or arms or broken noses. Several had lost their fingers. Their rough black skins were covered with dirt and gray scales, apparently resulting from some sort of skin disease. Their ears and noses had been pierced and stretched for nose plugs. Some had filed their teeth to very sharp points, and all of them had greasy, woolly hair which hung down in repulsive coils.

Their actions were as primitive as their appearances, for they showed the strain of the excitement in all the muscles of their bodies. They rolled their eyes and opened and shut their mouths, often without saying anything. They made inane motions with their arms or scratched themselves very openly with their finger-nails. And at the same time they constantly jumped from side to side and backward and forward as if the ground beneath them was very hot. They even seemed to be able to twitch their skins the way a horse does when shaking off flies. Inhibitions were entirely absent and every thought was instantly translated into action. Although these savages were repulsive, we got a tremendous "kick" out of seeing them, because they were so absolutely genuine. Quite obviously only two factors were operative in their minds: fear and greed.

Seizing the small automatic movie camera, I held it up almost in their faces and pressed the button. As the motor whirred I rejoiced in the thought that I was taking pictures such as it will soon be impossible to duplicate. At first the wild men did not notice the camera and I was able to secure several good views of them as they exchanged skulls, etc., for Father Kirschbaum's knives. Then I pointed the camera directly into the face of a bearded, nose-plugged old rascal who was standing on the bank close beside me, stretching out toward Cornelius a heavy stone axe. After a few seconds he heard the whirring of the camera and turning toward me, scrutinized me closely. Primitive though he may have been, he was able to read from the intent expression on my face that I was doing



Alarmed by the Sound of the Camera—the Wild Men at the Furthest Point to Which We Penetrated in New Guinea

something unusual—something that he could not comprehend. His eyes blazed with anger. Perhaps he thought that the little black box with a glass eye would cast a spell on him or steal his soul. At any rate, he raised his stone axe up over my head and emitted a blood-curdling yell which meant very clearly that I had better stop. Which I did and very quickly too!

After that I tried to "sneak" some pictures when I thought the wild men were not looking, but they were rather clever at seeing through my ruses. Before long another old man, whose opossum-tooth necklace I had just bought, caught me pointing the camera at him. He gave a long series of howls and jumped up and down shaking his long barbed spear at me. The rest of the gang joined in the howling and soon all of them were making threatening gestures.

"Let's move along the bank a little way," said Father Kirschbaum. "There's no telling how long we'll live if we stay around here. And for God's sake don't let them see that camera again!"

"I suppose these 'kewpie dolls' are all cannibals as well as head-hunters," said Cornelius while we were changing our location. "They look as if they were capable of anything."

"I doubt it very much," replied Father Kirschbaum. "In all the parts of New Guinea where I have lived the cannibals have never been head-hunters and vice-versa. For some reason which I cannot fathom the two do not seem to go together. Perhaps it would be an interesting subject to investigate."

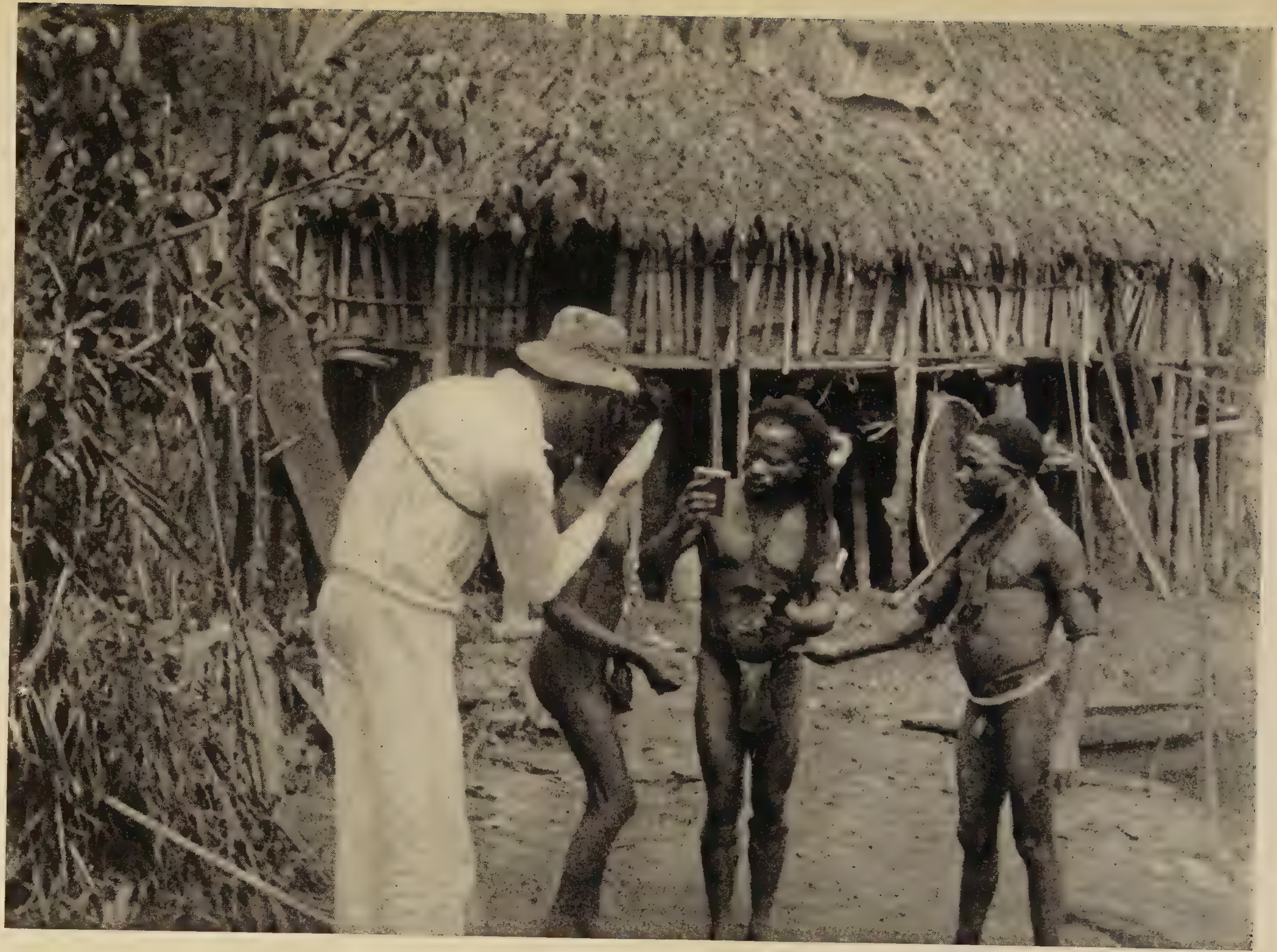
"There isn't much use in our moving upstream any further," said Dr. Moss. "Our little playmates are following us along the shore and if we get ahead of them they may get into their canoes and cut off our retreat. Besides, it's getting pretty late."

"Very true," said Father Kirschbaum. "What we can do, though, is to land up on the other side of the river for a short while. There are only enough canoes in sight to carry about a third of the men across."

This seemed a good idea, so we stopped at once on the further shore. Sure enough! About fifteen men jumped into all the canoes and came across to our side, leaving the rest vainly howling for means of transportation. We felt able to cope with the reduced number and Schmidty and I even dared to go on shore.

I walked about a hundred feet to a round house with a conical roof which was standing there, set on piles. In doing so I had to turn my back on the natives, but I could hear them following me. I certainly did wish I had eyes in the back of my head. Climbing up a ladder, I looked inside the house, but found that it was quite empty and not decorated in any way. Consequently, I had a good excuse for rejoining the others almost immediately.

In the meantime Schmidty had brought out a mirror. He held it up in front of one of the most bedecorated warriors. At first this savage was so busy waving his stone axe at Chuck Peavy in the hope of trading it that he did not notice the mirror. Then a flash of light seemed to catch his eye. He grabbed the mirror from Schmidty and held it in front of his face about three inches from his nose. It seemed to take him several seconds to focus his eyes, but after a while he realized that he was looking at his own image. And then, wonder of wonders, he smiled from ear to ear and began to giggle like a



A Mai River Savage Sees His Reflection in a Mirror for the First Time

Chuck Peavy acts as demonstrator

schoolgirl. Then he stuck out his tongue to its full length and examined that very intently. He became so pre-occupied that it was nearly a minute before consciousness of our presence returned to him. When it did he gave a sheepish grin such as almost everyone does when they are caught making faces in the mirror. The sight of this hairy monster smiling at himself in the mirror was one of the most ridiculous things I have ever witnessed.

After the mirror had gone the rounds Schmidty produced a box of matches. He motioned the natives to come close to him and to watch what he was about to do. Then he struck the match. The instant it lit the natives turned and ran for all they were worth, nor did they turn around until they had gotten behind convenient trees. Their hasty retreat was so funny that we all laughed very loudly and Schmidty struck several more matches to show the harmlessness of the act. At this the natives came out of hiding and walked half-way back. As their courage returned they all laughed very loudly as with the air of one who has known all along that a joke has been intended. It was interesting to note that their laughter sounded much like our own. But when Schmidty struck another match they ran away again.

While they were recovering from their second fright we noticed that the men who had been left on the other side of the river had run to a boat landing and were now bearing down upon us in canoes from the upstream side. It looked like an ideal time for us to go downstream. So we did! And now we have reached the *Illyria* just before dark.

(END OF DIARY)

Thus we had accomplished what we had come twelve thousand miles to do. We had cruised across the Pacific, we had collected many thousands of birds, mammals, reptiles, and fish for Field Museum and we had discovered in the very heart of unexplored New Guinea a tribe of wild men whose existence had never before been confirmed. Not only had we seen these primitive people but also we had traded with them, securing valuable anthropological data and photographs. To have learned more about them would have required a knowledge of their language, and a visit of several months' duration. We had found out all we could in the time at our disposal.

During the twelve hours we had been on the Mai River the water level in the Sepik had dropped nearly as many inches. In view of this fact it was necessary for us to start back toward the ocean immediately. We made much better speed going downstream and reached Marienberg only four days later. There we picked up Frank and Walt, who had collected and prepared more than a hundred specimens while we were away, and deposited Father Kirschbaum and his four native assistants. There is no need to say that we bid goodbye to the Father with the greatest regret, for it must be obvious to the reader that he had won our respect and admiration. And soon we found ourselves once more on the broad blue Pacific.

Our travels and adventures during the remainder of the trip are no part of this story, for after we left New Guinea our scientific work was practically over. At Borneo, the next stopping point, all the scientists except Dr. Moss went home to America by steamer. At Java, Cornelius, Chuck, Murry, Dr. Moss and myself left the *Illyria* and assuming the status

Photo by K. P. Schmidt

A Stone-age Warrior

of ordinary tourists, visited Java, Bali, British Malaya, Siam, French Indo-China, China, and Japan. Then we took a steamer home and reached the United States in late September, having been away nearly eleven months.

The *Illyria,* in the meantime, under Captain Boutilier and his moderately faithful crew, sailed through the Suez Canal, across the Mediterranean, past the shores of Italy, where she had been constructed only fifteen months before, and arrived in Boston on the 16th of October, 1929, eleven months to a day after she had left there. During those eleven months she had covered thirty-two thousand nautical miles. And for each of those miles we have a vivid, haunting memory of the South Seas.

ESSAY ON THE ZOOGEOGRAPHY OF THE PACIFIC ISLANDS

BY

KARL PATTERSON SCHMIDT

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The zoological explorations of the Crane Pacific Expedition brought its members into intimate contact with the problems of animal geography (or "zoogeography"). We had the extraordinary good fortune to follow the course of Charles Darwin in the Galapagos and South Seas, and in the same year to visit islands and collecting stations in the East Indies made famous by Darwin's great contemporary and co-evolutionist, Alfred Russell Wallace. Darwin's contact with the phenomena of distribution of animals in the Galapagos Islands played an important part in forming his ideas on the origin of species. Wallace, after years of intimate study of the animal life of the East Indies, made the geographic distribution of animals his special province. It was inevitable that this field should be one of the major interests of our expedition, as it is, in fact, of museum zoologists and of taxonomists in general.

The geographic distribution of animals, when analyzed into its various causative and historic factors proves to be an enormously complex subject. The restriction of a single species of animal to the particular geographic area which it now inhabits involves its whole range of relations with its environment,—climate, soil, vegetation, and other animal life; its adaptations to these conditions; and the whole evolution of the species with its migrations. Evolution and migration involve the geological history (including climatic changes) not only of the areas in which the animals now live, but of the regions in which their ancestors dwelt. It must be remembered that some species of animals are most affected by one environmental factor while others are relatively independent of it and vitally influenced by some other. Furthermore, the rates of evolutionary change as well as the rates of dispersal differ among the groups of animals. And finally these groups came into existence at different periods in the earth's history, so that they have been differently influenced by its geologic changes. When all this diversification of the problem is considered, the difficulty of untangling the various factors which have brought about the existing geographic distributions of animals becomes very evident. This very difficulty proves to be a fascination to those zoologists who are concerned with the classification of animals, for they are brought into close contact with the geographic problems, and may occasionally happen upon one in which the factors are simplified, and in which there is possibility of a satisfactory solution.

The Pacific Islands and the continental areas which border the Pacific present their full share of zoogeographic problems. The present essay proposes to introduce the reader to some of these, to express an opinion on others and to attempt the elucidation of a few with the illustrative material secured by the Expedition.

In the West Indies, Panama, and the Galapagos, we are brought into contact with the animal life of tropical America in three very diverse phases. South America was cut off from the rest of the world during early and middle Tertiary time, of the earth's geological history, while the evolution of mammals and birds in the Northern Hemisphere was at its height. This isolation of South America enabled many primitive forms to survive, while the length of its continuance is shown by the independent evolution of these strange and characteristically South American forms,—the opossums, sloths, anteaters, armadillos, peculiar and remarkable rodents, prehensile-tailed monkeys, and a host of extinct forms. Since the Miocene perhaps late Miocene or early Pliocene) the two Americas has been connected and a steady mixing of the animals of the north and south has since taken place, in both directions. Thus Panama is at the crossroads between two regions strikingly distinct in their animal life. The northern animals, especially the cats, wolves, and mustelids, appear to be much more advanced forms than the more primitive South American types, and their advent in South America undoubtedly played a part in the extinction of several forms, such as the ground sloths.

Many of the Miocene forms of North America which invaded

South America as soon as the land connection was reestablished, have now become extinct in the north, so that there is now a second wave of South American animals novel to a resident of North America. The tapirs, peccaries, llamas, and the curious allies of our racoons, the coatis and kinkajous, represent this second group of forms now essentially South American or "Neotropical." The existence of dense tropical forest from Panama to southern Mexico at the present time has enabled a large proportion of the forest forms of South America to spread northward to the limits of the forest. The southern tip of the North American continent is accordingly included in any definition of the "Neotropical Region"—the zoogeographic regions being geographic areas defined by their animal inhabitants.

WEST INDIES

The remarkable differences between the West Indian animals (with which we came in contact in Haiti) and those of South America can be alluded to only briefly. The peculiar South American mammals are wanting, and the large insectivorous mammals, the solenodons of Cuba and Haiti, are equally absent from North and South America. Extinct allies of these mammals in North America give a clue to their origin, which would otherwise be extremely obscure, as their nearest living allies are the tenrecs of Madagascar. The question at issue here is one that is vital to the origin of the animal life of all islands, —have they been connected in the past with continental areas and so been populated directly, or have they been always separated, so that their animal life reached them by various means across the intervening ocean? This question may be answered positively, one way or the other, for many islands. As for the West Indies, a real zoogeographic controversy has raged on this topic with reference to the Greater Antilles. I have recently had occasion to deal with this problem, and may refer the reader to my essay on it in "The Amphibians and Land Reptiles of Porto Rico."[1]

The question of the origin of insular faunæ offered no apparent difficulties to the believers in special creation, yet it was these assemblages of animals on islands that supplied cogent evidence for evolution to Darwin and Wallace. In spite of the arguments about the question of land connections between some islands and continents (and between some continents), islands may be classified with some success into two groups,—"continental," and "oceanic," according as they have or have not been joined to a larger land mass.[1]

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[1] *Survey of Porto Rico and the Virgin Islands,* Volume X, part 1, 1928 (published by the New York Academy of Sciences).

PANAMA

At Panama the existence of uniform tropical rainforest unbroken by mountains, so dominates the composition of its animal life that the question of origin is pushed into the background. Not all of the important groups of animals in South America have been able to work back against the influx of their more modern northern competitors, but the rainforest with its extremes of tropical conditions has brought with it the majority of the Guiano-Brazilian types. The ecological factors here outweigh the historical in importance. The questions to be asked are: how are the animals of the forest adapted to forest conditions? Are they like forest animals in other parts of the world? Has the existence of rainforest in tropical America been long enough to influence the course of evolution in its animal population?

We find not only anteaters, sloths, opossums, and monkeys, representatives of the ancient South American fauna, living a purely arboreal life and extraordinarily adapted in structure to life in the trees, but also the coatis, kinkajous and many other animals of the later invasions from North America. Prehensile tails (anteaters, kinkajous, howling monkeys, forest vipers) are a hall mark of arboreal habits and bring all these diverse animals together under this environmental classification. The struggle for existence has been severe for countless generations, and adaptation to special habitats within the environment has been a first law of survival.

COCOS ISLAND

Evolution at Panama has proceeded so evidently by the process of adaptation, that it is illuminating to find species whose distinctness is not at all due to adaptive characters on the adjacent Cocos Island. Their evolution must be accounted for on some different ground, and this appears to be the strictly geographic one of isolation. Cocos Island, two days sail west of Panama, is densely wooded and richly fertile, yet its native animals are astoundingly few, especially in contrast with the rich Central American fauna at Panama.

[1] *Vide* Wallace, *Island Life,* third edition, 1919.

There are four species of land birds to be found—a cuckoo, a finch, and a flycatcher, which are distinct Cocos Island species, not found elsewhere, and the ubiquitous yellow warbler, which is scarcely distinguishable from its mainland relatives. Besides these there are two species of lizards—an anolis and a small gecko,—which are distinct from any mainland form. There are no mammals, no snakes,[1] and no amphibians. Had Cocos been joined to the mainland it would have received a much greater variety of animal life, and there is probably entire agreement among zoologists that it represents the "oceanic" type of island. There is no difficulty in accounting for the presence of the birds, since numerous individuals of North American birds regularly reach the much more distant Bermudas. The lizards are supposed to have reached the island on floating vegetation, and as both are arboreal and small forms, this does not in this case seem an insuperable difficulty. The differentiation of the five distinct species of vertebrates appears to be due to isolation alone. Variation and evolutionary change being continually in process, the separation of a single pair or group of individuals from the remaining stock of the species enables it to pursue a slightly different course of evolution. The slight differences have a cumulative effect, and the two stocks are presently distinct species; the mainland or parent stock being the one most subject to change, the insular form is likely to be more or less closely representative of the ancestral stock before separation and divergence took place.

Cocos Island thus exhibits a number of the phenomena of the geographic distribution of animals, with especial reference to islands, which recur in all parts of the world. They may be summarized as follows:

1. The island has only a few native species.
2. These are mostly distinct from those of any other part of the world.
3. They are, however, allied to Central American forms (the nearest land mass).
4. They are forms whose transport or passage across the intervening ocean is understandable.
5. The species have probably arisen in consequence of geographic

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[1] A snake was reported to have been seen on Cocos by Dr. Townsend on the occasion of the visit of the *Albatross* in 1891, but no specimen has ever been taken.

isolation, without indication of adaptive change or changes due to natural selection.

A minor feature of the Cocos fauna, which becomes sadly familiar in oceanic islands, is the introduction of house rats, cats, and pigs, all of which flourish extraordinarily. The presence of these introduced forms is greatly to be deplored, for they bring with them changes in the native conditions, and are all too likely to bring about the extinction of some or all of the peculiar native, or endemic forms. The sad history of those incredible insular birds, the dodo and solitaire of the Mascarene Islands, is perhaps the most notable case in point.

THE GALAPAGOS

The animal life of the Galapagos Islands is equally rich in fascinatingly interesting problems of both ecologic and historic zoogeography.

The high lights of the vertebrate fauna are:

1. A great abundance of marine mammals, including various species of whales, a fur seal, and the Antarctic sea lion.
2. A paucity of land mammals, with a total of five species belonging to the two genera *Oryzomys* (South American) and *Nesoryzomys* (exclusively Galapagoan), though this generic arrangement probably requires revision.
3. An extraordinary abundance of individuals and variety of species of sea birds, including especially the Galapagos penguin and the flightless cormorant, which are confined to these Islands.
4. A surprising number of species of land birds, rather numerous in individuals in favorable localities. These include the remarkable Galapagos finches, which are confined to this group of islands, and the much less differentiated mockingbirds, ground doves, flycatchers, etc., with the ubiquitous yellow warbler.
5. Among reptiles the small geckonid lizards of the genus *Phyllodactylus;* two large iguanid lizards which belong to distinct genera, one marine the other terrestrial; small iguanid lizards of the genus *Tropidurus;* gigantic land tortoises; and snakes of the genus *Dromicus.*
6. A total absence of amphibians.

The many zoologists who have visited the islands have aligned themselves into two distinct schools on the question of the origin of the flora and fauna of the Galapagos. The older writers, especially Darwin and Wallace, thought of these islands as essentially oceanic, never in connection with the adjacent continent. On this hypothesis, their animal and plant life was received by trans-oceanic transport or active flight. W. D. Matthew, among recent authorities, supports this view. The difficulty of the journey and the chances against transport supply the direct explanation of the poverty of the fauna.

Many later students of the Galapagos have maintained that the islands *were* connected with the mainland, and that this connection was with Central America rather than South America, via a submarine plateau which now exists at the depth of 1000 fathoms. George Baur was perhaps the most vigorous supporter of this theory, which was favored by William Beebe in 1924 (*Galapagos: World's End*, p. 420). Beebe finds himself much less convinced of the necessity of the land connection hypothesis in 1926, after seeing a vast amount of floating tree trunks and other land vegation at sea between Panama and the Galapagos, described in *The Arcturus Adventure.* The principal objection to the hypothesis of land connection is that many more groups of animals should have reached the islands via a land bridge. The absence of amphibians, especially, is an argument for oceanic origin of the islands.

Considering the vertebrate fauna, as outlined above, with respect to its origin, the marine mammals obviously require no land connection to account for their presence. The highway for the Antarctic sea lion is provided by the cold waters of the Humboldt Current, and the abundance of these large mammals, together with that of the whales and porpoises, is a question of ecological zoogeography, to which I shall return below.

The land mammals consist of five species of rodents which have been referred to the genera *Oryzomys* and *Nesoryzomys.* Osgood, in discussing the new species of *Nesoryzomys* discovered on Indefatigable Island by our expedition[1] remarks with reference to the zoogeographic problems; "with the addition of *N. darwini* to the other forms above-mentioned, the rodents of the islands take on considerably more importance than formerly, and will doubtless need serious consideration in speculation regarding the derivation of the insular fauna. Until thorough study of mainland forms is made, however, no satisfactory conclusions are to be expected. While the oryzomine rodents are widely distributed and greatly varied in South America, they are also highly developed in Central America, and no competent study of the whole group has yet been undertaken. However, the number and diversity of the island rodents may perhaps be taken as indicating that their existence on the islands is not an accidental matter and the view is somewhat substantiated that the present land area has been reduced from former larger proportions."

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[1] Osgood, W. H. *A New Rodent from the Galapagos Islands,* Pub. Field Mus. Nat. Hist., Zool. Ser., Vol. XVII, No. 2, p. 22.

My own conclusion regarding the evidence from these native land mammals is that they do not support the land bridge hypothesis. If the land bridge was ancient, the rodents should represent genera no longer extant on the mainland. If it was recent, a much greater variety of animals should have crossed, and the argument that a richer fauna has become extinct due to vulcanism loses its force, especially for the older islands in the southern part of the archipelago.

The sea birds, like the marine mammals require no land bridge to account for their presence, which falls into obvious relation with the Humboldt Current. The Galapagos penguin is specifically distinct from its nearest relatives on the Peruvian coast, apparently through simple isolation, while the other flightless species, the Galapagos cormorant, exhibits the familiar phenomenon of loss of flight under insular conditions. This appears to result from disuse, with the absence of enemies, combined with the direct selection of the "stay at homes," which enjoy the advantages of safety and abundant food supply in the Galapagos.

The land birds of the Galapagos are remarkable for their charming fearlessness, which has impressed every visitor to the islands, and which is in itself an evident accompaniment of insularity and absence of enemies. The mocking birds especially delight in accompanying any person out for a walk, alighting beside him and bursting into song. The freedom from persecution is now a thing of the past, for the introduced dogs and cats, constantly faced with a dearth of other food, threaten to exterminate the trustful and helpless birds.

With regard to their origin, the birds fall into two groups, those which are strikingly peculiar to the islands on one hand and a much larger list of species which are only slightly or not at all distinct from their mainland relatives.

ZOOGEOGRAPHY OF THE PACIFIC ISLANDS

The ecological phenomena presented by the animal and plant life of the Galapagos are even more interesting than are the speculations regarding the origin of the life of the islands, which, on account of the total want of palæontological data, are likely to remain speculations. The relations between the plants and animals and their extraordinary environment, on the other hand, are subjects open to systematic scientific observation, correlation, and experiment.

Narborough, the westernmost of the larger islands, presents unique environmental conditions. It is a rounded dome-shaped volcano, more than 4000 feet high, fringed with a flat plain of jumbled lava. The great eruption of 1825 described graphically by Morrell, covered the greater part of the island with fresh lava, which poured into the sea on all sides. The cooling and solidifying surface was carried along by the flow beneath, and these flat slabs, no two alike in surface or in size, were buckled and broken en route, and now compose the coastal shelf. A few islands of grayish vegetation, representing the older island surface, may be distinguished on the side of the mountain, but four-fifths of the total area must have been flooded over with lava.

On this glassy lava there is an unparalleled assemblage of animal life. Sea lions come ashore to sun themselves, to play in the surf, or to nurse their young. The assemblages of marine iguanas are the largest to be found anywhere in the islands, as many as seventy-five by actual count in a space thirty feet by twenty.[1] Boobies, black gulls, cormorants, and the penguins share the ledges of lava with the sea lions and sea lizards, an extraordinary, mutually amiable assemblage. Cormorant and penguin and marine iguana, equally dependent on the sea for their food supply with the sea lions, illustrate the broadest generalization that can be made about the life of Narborough, that all life is here dependent on the sea. It is the unfailing source of food in the waters of the Humboldt Current which makes possible the astonishing wealth of life on the glassy lava. Even the mangrove is dependent for its first foothold on the accumulation of the sand in cracks and hollows in the rock, while this sand is wholly the product of the calcareous shells of marine animals beaten to bits against the lava. Only one other woody plant has gained a foothold, where this sand has been carried inland and where some protection is supplied by the mangrove, which, once established, favors the accumulation of more and more sand. Drift of fine sand and the dried dung of lizards, birds, and sea lions, lodges in crevices in the lava, and affords a foothold for a single species of sedge, one of grass and the single kind of cactus. These in turn afford food for the grasshoppers and crickets. Spiders spread their nets between cactus stems or between blocks of bare lava for flies, which evidently depend for their existence on the carcasses of marine mammals and birds, whose skeletons are not infrequently found on the shores, and perhaps on occasional accumulations of dung. The small lizards, which would elsewhere be insectivorous are here crab eaters, as probably the native rodents are also. Where dependence on the sea for food is direct, the numbers of the animals are astonishing. Where it is indirect, it is scanty in the extreme.

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[1] Even this does not compare at all with the scene photographed by Beck (Novitates Zoologicæ, Vol. IX, p. 364.

Narborough thus illustrates the first stages in the great phenomenon of ecological succession, in which one set of animals and plants prepares the way for another. The relations are plain on Narborough because they are so greatly simplified by the glassy sterility of the lava, which has not weathered appreciably in its first century, so that dependence on the sea becomes a first law of existence. Dependence for organic food supply on the sea is simplified in turn by the unparalleled richness of the life in the waters of the Humboldt Current, which in turn draws for the basic food supply on a vast portion of the Pacific Ocean.

It is this great oceanic current which dominates the ecological relations in the Galapagos. To understand this effect we must trace the current itself to its origin.

This oceanic stream is radically different in nature from the more familiar, river-like Gulf Stream and Kuro-shiwo, which carry warm surface water from the tropics to the arctic zone. Wherever the tradewinds blow off shore from the continents, a surface drift of the sea water is set in motion. To replace this, water wells up from the bottom, and, where the shores are steep, from great depths. The Humboldt Current is composed primarily of cold water from the bottom of the Pacific, which wells up in a belt some thirty or forty miles wide along the coast of Chile, to replace the surface water carried away by the southeast trades, which blow off-shore toward the Equator. At the surface, guided by the prevailing winds, the accumulated cold water flows northward until it is deflected by the great bend in the Peruvian Coast, to continue away to the westward to wash the shores and modify the climate of the volcanic Galapagos Islands. Thus it is not the cold waters of the Antarctic which wash the coasts of western South America, but primarily the still colder waters of the Abyssal Pacific.

The distribution of life in the oceans is dominated by the primary dependence of plant life upon sunlight, which penetrates only the uppermost levels of water, while all animal life is either directly or indirectly dependent in turn upon plant material for food. Sunlight, in amounts effective for plant growth, penetrates only about 300 feet below the ocean surface, and the great bulk of marine life is confined to this lighted zone. The animals below it, and those of the oceanic depths, all depend for food on the steady rain of plant and animal remains from the richer surface waters. At whatever depth, the ultimate fate of all living matter in the ocean is to sink to the oceanic floor. By its decomposition, the cold water of the deep sea becomes a vast storehouse of the chemical compounds, especially those containing the essential nitrogen, on which plants primarily depend for their food supply. Wherever, from any cause, this richly fertile water is brought to the surface, it becomes rich in both oxygen and carbon dioxide, on account of its low temperature, and its silica content is also higher than that of warmer waters. With a food supply so unfailing, and every other condition favorable, the waters then teem with plant life as soon as they receive sunlight, and with the plants appears the long chain of animal forms which depend on them and upon one another for their food supply. The microscopic plants, especially diatoms, form the food of minute crustaceans, and other small animals; these are preyed upon by larger invertebrates and the smallest fishes; these, in turn, feed the larger fishes and such other animals of considerable size as the cuttlefishes. The final links in the chain are the largest animals, the sharks and whales in the waters, and the sea-lions and vast numbers of sea-birds which come from the adjacent shores or islands, themselves with no enemies except man. This greatest of all "food-chains" can thus be traced from the astronomical causes of the primary circulation of the earth's atmosphere, and from a direct dependence on the whole life of the Pacific, step by step to the whaling industry which made the coasts of Peru and the Galapagos familiar to two generations of New England sailors. Surely this is one of the grandest of all cycles of biological phenomena.

ZOOGEOGRAPHY OF THE PACIFIC ISLANDS

POLYNESIA

The 3000 mile stretch from the Galapagos to the Marquesas is the widest area in the South Pacific without some islands which might serve as stepping stones for the transfer of at least occasional animal immigrants. The animal life of the Marquesas, ancient volcanic islands though they are, with fertile soil and abundant vegetation, is vastly more impoverished than that of the Galapagos and it proves to be related to the Australian and East Indian regions rather than to the American. There are no native mammals whatever, a very few endemic birds, whose relatives are to be found to the westward, and a most curious list of lizards, with no snakes. The lizards prove to represent four species of geckos and three of skinks.[1] The geckos are known to attach their eggs to bark and tree trunks and the skinks are for the most part abundant beach lizards, one (*Leiolopisma noctua*) being especially a frequenter of native canoes (two of the specimens secured on the present expedition were found one in a canoe and one under trash on the sea beach). Thus presumptive evidence that these species are able to find transport from island to island, is reenforced by the somewhat surprising fact that no endemic forms have arisen. These same seven species are found from island to island without sign of specific differentiation, not only in the Marquesas, but in the Societies, the Cook Islands, Samoa, Fiji, and on through the New Hebrides and Solomons to New Guinea, a range of thousands of miles covering thousands of islands. This is very unlike the situation on Cocos, where the two species of lizards, transported in the same way, have become distinct forms by continued isolation; and it is wholly unlike the peculiar fauna of the Galapagos, if we suppose the iguanas and tortoises to have arrived there across the ocean. We are thus faced with a clear-cut problem about insular lizard faunas which calls for explanation.

Two factors seem to be involved. Australia, New Guinea, and the East Indies in general have a rich lizard fauna, which extends eastward through the Pacific islands with fewer and fewer species in each archipelago, until, beyond the Fijis, there is no more change and only our seven familiar ubiquitous Polynesian lizards are left.

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[1] The geckos are: *Gehyra oceanica, Peropus mutilatus, Hemidactylus garnotii,* and *Lepidodactylus lugubris.* The skinks are: *Emoia cyanura, Leiolopisma noctua,* and *Cryptoblepharis pœcilopleurus.*

The chance of transport diminishes in some ration with the distance of the island from the mainland, thus accounting for the steady diminution in the number of species. The difficulty of transport in addition, acts as a screen so that beyond the last representatives of the mainland fauna, only that limited series of forms is able to pass in which there is some fitness of the animal for oceanic transport. These forms are spread with such rapidity and regularity that the constant influx of new individuals prevents the differentiation of the insular populations, which are not, in fact, effectively isolated.

The alternative solution in Polynesia would be a vast Pacific continent sunk out of sight at so recent a date that there has not been time for differentiation of species. This alternative offers so many geological as well as zoogeographic difficulties that it may be summarily dismissed.

Why then did not the turtles and iguanas of the Galapagos continue to float across the intervening ocean and prevent differentiation of Galapagoan species? It seems evident that while one of the explanations lies in the fortuitous nature of such dispersals, a second is available in the age of the islands. There are no more reptiles of this type on the continent to float across, for they have been replaced long since by more modern stocks which have arisen under the stress of continental competition or which have arrived as an exterminating force from some other region. The insular fauna is then a relict one, representative of a former geologic age on the continental areas. In the Galapagos two other factors may be invoked to account for successive waves of transport. These are, first, the former greater area of the Galapagoan land mass at a time of union of the existing islands; and, second the alterations in the set of oceanic currents which must have been notable during the opening of a strait at Panama in the Miocene and again under the stress of climatic change during the glaciation of North America.

It becomes necessary to account for one more phenomenon of special zoogeographic import in the Polynesian islands. The land birds compare with the lizards in the fewness of their species, but contrast with them in the development of endemic forms peculiar to certain islands or to certain groups of islands. For this we may invoke first a hypothetically more rapid rate of species-making in the birds; and second a homing tendency, combined with their very mobility, which enables a species once adapted and attached to a single area to return to it from most accidental trips to other islands, a course which is not open to lizards.

THE FIJI ISLANDS

The Fiji Islands present the first considerable landmass encountered in crossing the Pacific to the westward. There is important geological evidence, primarily the presence of metamorphic and ancient sedimentary rock, to indicate that they may be an eastern outpost of a former land area of continental proportions, or at least with continental connections, whose breaking up has left New Zealand and New Caledonia as well as New Guinea and the Solomon Islands.

The evidence from the Fijian animal life affords considerable support to the hypothesis of continental origin. It is much richer in every group than that of the uniform small islands of Polynesia. Mammals, to be sure, are still absent, with the exception of the somewhat problematic rodent, *Rattus exulans,* which is said to inhabit various of the archipelagos of the western Pacific, and of the several species of bats. There are frogs of two kinds, the first to be encountered since leaving the mainland of South America. Snakes of four species, a blindsnake, two boas, and a poisonous elapid, afford equally striking evidence of a change in the nature of the fauna. No less remarkable are the large iguanid lizards of the genus *Brachylophus,* which is allied to the land iguanas of the West Indies and the Galapagos. Another large lizard, an agamid, reaches the Fijis from New Britain. In addition to these novelties (from a Polynesian viewpoint), there is a whole series of species of lizards of the skink family which range widely through the islands eastward of New Guinea, reaching the Fiji Islands, but extending no further.

This variety of amphibians and reptiles gives a plainly continental aspect to the Fijian fauna, especially by contrast with the Polynesian poverty, and some other groups of land animals, especially the mollusks and the insects, are similarly developed. The absence of mammals may be interpreted here as in New Zealand as an indication of separation at an extremely early date. The iguanid lizard suggests an age about equivalent to that of the separation of the West Indies from the Americas and of Madagascar from Africa, since both these areas support related forms. *Brachylophus* need not be derived from the Americas, since the Madagascan iguanid lizards as well as fossils from the Eocene of Europe, prove that this family formerly had a wide range in the Old World, where it is now extinct except for the relicts in Madagascar and the Fijis.

The insolubility of such a problem of continental connection without geological data is evident when the considerations contrary to the hypothesis of continental derivation of the fauna are examined. In New Zealand, the single genus of frogs (*Liopelma*) is a representative of the family Ascaphidæ, otherwise known only from western North America. These are unmistakably the most primitive of all the frogs, and so bear out excellently the hypothesis of a land connection of New Zealand too ancient to have brought mammals with it. The Fijian frogs, on the other hand, are representatives of the most modern family of frogs, the Ranidæ, and are only slightly distinct from allied Solomon Island forms. There are neither primitive mammals nor extraordinary flightless birds in the Fijis to link up the fauna with that of Australia or New Zealand. New Caledonia lacks not only mammals but frogs as well, and the same is true of the New Hebrides, much closer to continental Australia than the Fijis. Extinction must be supposed to have played a large part in the impoverishment of all these insular faunas if their continental origin is to be maintained.

The continental origin of these west Pacific islands is on a wholly different footing than the various suppositions of connection of New Zealand and Australia with South America, or with Antarctica, and even a wholly adequate proof of the land connection from Asia to the Fiji Islands would not contribute evidence in favor of such trans-Pacific land bridges.

THE SOLOMON ISLANDS

The Solomon Islands present a land life of colorful richness. Nowhere are there more brilliant parrots. Beautiful cockatoos make their appearance. Great hornbills, their wingbeats making a noise startlingly like that of a puffing train, are met with for the first time. Other birds are abundant. Among mammals are several native rodents of large size and a marsupial phalanger. The variety of frogs is great, and these are remarkable forms found nowhere else in the world. Lizards are present in extraordinary variety, and there is a considerable number of snakes.

No zoogeographer would hesitate to ascribe this rich fauna of the Solomons to a former land connection with New Guinea. The date of separation, however, must be set far back in geologic history to allow for the development of the great wealth of forms peculiar to the Solomons, and to account for their great divergence from their New Guinean allies. The problem in historical zoogeography in the Solomon Islands is a peculiar one. The archipelago is nearly 700 miles in length, and includes about a dozen large islands with a great number of small ones. Several of the larger islands are more than 2000 square miles in extent, with central mountains rising to an elevation of 8000 feet on Guadalcanar and more than 10,000 feet on Bougainville. In spite of the evidence that the fauna is an old one, the individual islands have not developed peculiar species. The remarkable frogs, no less than the lizards are found from one end of the archipelago to the other, with only minor differences discernible among the different island populations. Although much more collecting is required before the Solomon Island fauna is really adequately known, it seems certain that this conclusion will stand fast and that the fauna is in reality a very uniform one. The contrast with the larger West Indian islands, each of which has its own species and even genera, is extreme.

Evidently we must suppose that the Solomon Islands have been united into a single land mass until very recent time, and that this land mass was long separated from New Guinea and from the islands of the Bismarck Archipelago. It is surprising to find that New Ireland, whose central range is a continuation of the main mountainous axis of the Solomons, has a fauna like that of New Britain and New Guinea. A detailed study of New Ireland and Bougainville might yield important material to modify this conclusion, as both of these large islands are very little known.

NEW GUINEA

The Island of New Guinea, from the standpoint of geographic zoology, is a part of the Australian Region, to which it is intimately allied by the presence of marsupials of many kinds and of the monotremes (egg laying mammals), represented by a large spiny anteater. While the distinction from Australia proper seems to be due principally to the ecological differences between the strictly tropical rain forest and great mountain ranges of New Guinea, and the plains and desert and bush of the more temperate Australia, the New Guinean area has so rich and so peculiar a fauna that it requires separate consideration in any zoogeographic account. The faunal relation between the mountains of New Guinea and the plains of Australia has recently been compared with that of the tropical Andes to the great South American lowland.[1]

New Guinea is especially rich in birds, and these are rich in brilliantly colored forms. To see the brilliantly colored fruit pigeons of the South Seas is to learn a new meaning for the word "pigeon"; and these, one learns in New Guinea, are merely outposts of that center of the pigeon tribe, their great variety climaxed by the magnificent crowned pigeons, the gouras, which are among the most beautiful game birds of the world. The raquet-tailed kingfisher is the most handsome species of the similarly abundant kingfisher group. Most notable of all are the birds-of-paradise, which are almost entirely confined to New Guinea. Parrots and cockatoos are wonderfully numerous and varied, ranging in size from the tiny dwarf parrot, scarcely four inches in length to the great black cockatoo, one of the largest of all parrots, whose incredibly powerful bill cracks even the iron-hard canari nut. The flightless cassowary, nearly as large as an ostrich, is not only the largest bird of New Guinea, but is one of the largest animals of the island, much hunted for food by the natives. Small birds are present in great variety, so that no region in the world is richer in peculiar species.

The wealth of birds is not matched by any corresponding wealth of mammals. These include, among marsupials, a variety of small wallabies, the tree-kangaroos, arboreal phalangers with prehensile tails, and flying phalangers which glide from tree to tree like our own flying squirrels. The egg-laying monotremes are represented by a spiny anteater (*Zaglossus*) twice as large as the more familiar echidnas of Australia. The higher mammals are represented by a few rodents and by the wild pig, which last was undoubtedly brought from the Asiatic islands by the ancestors of the Melanesian tribes, in the course of their eastward migration.

The reptiles are less remarkable than the birds or mammals, with but a few genera confined to New Guinea, though there is a great variety of lizards of the skink family. Amphibians, on the other hand, are extremely peculiar. Cæcilians and salamanders are absent, but the frogs are represented by no less than thirty genera confined to New Guinea, together with a large series of tree-frogs and true frogs of more widespread groups. The tree-frogs of the genus *Hyla* are allies of the South American tree frogs, and perhaps parallel the relation between the marsupials in the two regions.

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[1] Austin H. Clark, Annals Assoc. Amer. Geogr., Vol. XVII, No. 3, p. 137, 1928.

New Guinea is the most fascinating territory left in the world for zoological exploration. So much remains to be learned about its animal life, especially in the discovery of new forms, that we are scarcely ready for any theoretic discussion of its zoogeographic problems. A new species of crocodile, described by myself in 1928, and first seen alive in the field by Crane Pacific Expedition, illustrates the fact that even the larger animals of New Guinea are as yet incompletely known. A new bird-of-paradise described from the coastal region of Northeastern New Guinea is an equally recent discovery of a conspicuous form. Who can foretell what remarkable creatures may yet come from the mountains of the interior? Plainly the great problem here is the elementary one of exploration and discovery.

The land animals of New Guinea and Australia compose the most distinct fauna of the world, in many respects, due to their primitive character, corresponding to a fauna of long past geological ages in other regions. As in South America, an ancient population has been preserved by being cut off from the main stream of evolution on the larger northern landmass of Eurasia and North America. The contrast between the life of New Guinea and the life of the great Southeast Asian promontories with their outlying islands, Borneo, Sumatra, Java, and the Philippines, is accordingly the greatest to be encountered in any zoological journey. It is this profound contrast that charmed Wallace in the eighteen fifties; and even the seventy years that have since gone by have failed to exhaust the field of study offered by the chains of islands which, astonishingly enough, bridge the gap between the New Guinean and Oriental regions. Here, in the Moluccas, Celebes, and the Lesser Sunda Islands, together with New Guinea itself, the least-known islands and the least-known animals are offered for further explorations and studies in Animal Geography.

SUMMARY OF COLLECTIONS

MADE BY

Crane Pacific Expedition 1928–29

The collections made for Field Museum of Natural History by the Crane Pacific Expedition include:

Mammals	881	specimens	
Birds	1,200	“	
Reptiles and amphibians	2,008	“	
Fishes	12,000	“	(approximate)
Insects (exclusive of termites)	1,000	“	“
Termites	75	vials	
Crustaceans	500	specimens	(approximate)
Mollusks	300	“	“
Worms	100	“	“
Echinoderms	50	“	“

Of these specimens, especially of the birds, mammals, reptiles, and fishes, a series of forms desired for exhibition was prepared in the field to be mounted for Field Museum's exhibition halls. The remainder of the collection, secured primarily for the Museum's study collection, will form the basis for a series of scientific reports, to appear in the Publications of Field Museum under the collective heading of "Scientific Results of the Crane Pacific Expedition."

The first of these reports, published in 1929, was:

Osgood, Wilfred H., "A New Rodent from the Galapagos Islands," Publ. Field Museum, Zool. Ser., Vol. XVII, No. 2, pp. 19–24, 1929.

There are in press or in preparation the following:

Sanborn, Colin Campbell, "Recent Collections of Bats from Polynesia, Melanesia and Malaysia."

HELLMAYR, C. E., "Notes on New Guinean Bower Birds."

SCHMIDT, KARL P., "Remarks on the two species of New Guinean Crocodiles"; "The Amphibians and Reptiles of the Fiji Islands"; "Notes on the Reptiles of the New Hebrides"; "A Contribution to the Herpetology of the Solomon Islands"; and "Notes on the Amphibians and Reptiles of New Guinea."

HERRE, ALBERT W., "Report on the Fishes of the Crane Pacific Expedition."

BERRY, S. STILLMAN, "Cephalopods collected by the Crane Pacific Expedition."

EMERSON, ALFRED E., "Termites collected by the Crane Pacific Expedition."

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